The Garden Journal

of The New York Botanical Garden

Vol. 4, No. 5 Sept.-Oct., 1954

35c a copy

October 22, 23, 24 — Tenth Annual Chrysanthemum Show in cooperation with the Westchester and Long Island Chapters of the National Chrysanthemum Society, in the Conservatory.

October 23 — Annual Flower Arrangement Competition for School Children, sponsored by the volunteer Associates of The New York Botanical Garden and the School Garden Association of the Board of Education of the City of New York, in Museum Building, 9:30 - 12 Noon.

November 5 - 28 — Chrysanthemum Show — "Reflection of Old Japan." — in the Conservatory.

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THE GARDEN JOURNAL
of The New York Botanical Garden

DOROTHY EBEL HANSELL
Editor

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CREDIT FOR ILLUSTRATIONS

Front cover, colored illustration of Sales Service, Range No. 1 of the Conservatory of The New York Botanical Garden by E. N. Mitchell; pp. 134, 135, J. C. Carter; p. 136, The New York Botanical Garden; p. 137, left, Paul Genereux — courtesy "American Nurseryman," right, Roche; pp. 139, 140, Peggy Schulz; pp. 141, 142, 143, The New York Botanical Garden; pp. 147, 148, 149, 150, Romeo Meloche — courtesy the Montreal Botanical Garden; pp. 152, 153, K. Blakeley; pp. 154, 155, Nelson Coon; pp. 157, 158, 159, Elise Ludlam Bowles; p. 162, upper, Gilda Potenza, lower, Alfred Cook; p. 163, upper left, Dr. Braun-Blanquet, center, Chase Ltd. Photo, lower right, Walter Singer.

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The Garden Journal of The New York Botanical Garden is published bimonthly by The New York Botanical Garden, Bronx Park, New York 58, N. Y. Printed in U. S. A. Re-entered as Second Class Matter, February 1, 1951, at the Post Office at New York, N. Y., under the Act of August 24, 1912. Annual subscription, $2.00. Single copies 35 cents. Foreign countries and anywhere outside the continental United States, 50 cents a year extra.

It Shouldn't Happen to a Tree

By **J. C. Carter**

In thinking about "It Shouldn't Happen to a Tree," let us think in terms of what is best for the tree to grow. We expect the tree to grow luxuriantly and to be beautiful for many, many years, possibly as long as we live. Yet, we must remember that a tree has the same trunk and branches which continue to enlarge and elongate year after year and any injury, including that caused by man, which occurs one year may affect the growth and appearance of the tree for many years to come. However, damage to the leaves usually is much less permanent in effect, since a new crop of leaves is produced each year.

We must not blame man for all the things that shouldn't happen to a tree because a tree can be injured, retarded in growth and sometimes killed by diseases, insects, and adverse climatic and environmental conditions.

Suppose we assume that a tree could talk and tell us its ups and downs as it grows through the years.

Say, folks, as a tree representing myself and all other trees, I appreciate this golden opportunity to give you a "tree's eye view" of how I live and the things that may happen to me. First of all, like the animals, I need food to grow. Since I have no mouth, I must rely on my roots to obtain food in the form of minerals in the soil. This food can be taken in by my roots, when it is dissolved in water. Also, I need plenty of water to keep my sap supply sufficiently abundant to circulate throughout my roots, trunk, branches, twigs, and leaves. The minerals are carried in the sap to my leaves, where they are manufactured into sugars and other foods which I can use in growing. My leaves must have plenty of green material called chlorophyll and plenty of sunshine and air to change the minerals into sugar and other foods. I use these foods to make more cells so that a ring of wood is laid down each year beneath the bark of my roots, trunk, and branches; and also my shoots grow longer by several inches, so I become bigger year after year.

This is enough about how I live and grow. Let us get on with some of the various things that shouldn't happen to me, or to any of my brothers and sisters. Since my roots must grow in the soil, I cannot move around like an animal but must be able to take the bad as well as the good which comes my way. You might think of it as watching the world go by. There are the diseases and insects which may kill or eat my leaves, or even kill some of my branches. However, I usually can overcome most of these difficulties by producing more branches and more leaves. Sometimes man helps me to overcome them by spraying me with materials that kill the germs and insects. But the finest help that man can give may not save my cousins the elms from the killer diseases, Dutch elm disease and phloem necrosis, nor the oaks from the fatal oak wilt.

Nature is my friend and furnishes me air, sunshine, and rain, but sometimes nature becomes upset and storms cause me trouble. Since my roots anchor me to one spot, I must stand and take what comes. Tornadoes break my branches and occasionally uproot and destroy some of my brothers and sisters. Lightning strikes my branches and runs down my trunk. If my bark is wet, the electric charge usually travels outside my bark and goes to the ground, without disastrous results. However, if my bark is not wet, the current is likely to travel down through my sapwood and that may be disastrous. The electric charge creates so much heat, that my sap changes to steam and I may blow my bark! No doubt you have seen this kind of damage where the bark is split and the sapwood is shredded. A severe shock like this can be fatal.

There are times when I have personal difficulties with my branches and roots. Some branches are weak and die from crowding, lack of sunshine, or rubbing against stronger and larger branches. These weak branches should be removed to make room for the stronger branches. Any branches which die will be attacked by wood rotting fungi and in time rot off. However, this is dangerous because the fungus may get into my trunk and live for many years, causing my wood to rot and cavities to form. Water collects in these cavities and more rotting takes place. Also, birds, squirrels, and other animals make homes in these holes. Another personal difficulty occurs when some of my roots take a crazy notion to grow across other roots or to crowd my trunk. You can imagine how confused I become in trying to get water and minerals from the soil, when my roots get crowded as shown in figure 1. A few crazy roots overlapping and pressing on my normal roots produce a girdling effect and reduce the flow of sap. Occasionally, the bark on my trunk above these crazy roots is starved and dies. Such extensive injury may prevent sap from flowing to branches above the injured area and these starved branches die.

Sometimes man upsets my normal way of growing and so I have "man-trouble." Before mentioning some of these troubles, I want you folks to know that I love man. He is one of my finest friends. He prunes my branches, gives me food and water to make me grow fast and large so I can give plenty of shade. However, these "man-troubles" may arise from accidents, carelessness, chance, improper care, or lack of knowledge about my normal development and growth, and the functioning of my roots, trunk, branches, and leaves.

Accidents may occur when I am given fertilizers and when I am sprayed with fungicides and insecti-

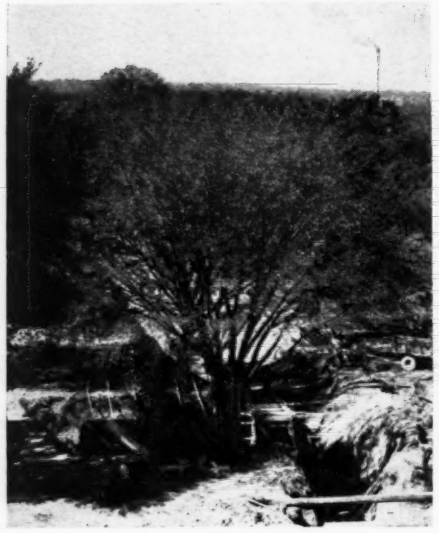


Fig. 3. Carelessness in excavation, especially cutting off many roots within three to six feet of the trunk, can cause leaves to turn yellow and fall prematurely; frequently branches die. Some trees cannot recover from such rough treatment.

Fig. 1. Overlapping or "crazy" roots girdle normal roots and reduce the flow of sap between the roots and the leaves. Sometimes they press against the trunk and kill the bark as shown, where some of the outer rough trunk bark has been removed.

cides, or when chemical weed killers are applied to the grass beneath my branches. Sprays may be too strong or applied at the wrong time. Dormant oil sprays, which control my scale insect enemies, are not safe to apply on some of my relatives such as beech, butternut, hickory, hard and Norway maple, mountain ash, and walnut. If I have large dead areas of bark, especially around the lower part of my trunk, I may be severely injured or even killed by heavy applications of fertilizer. Fumes and spray drift of chemical weed killers, such as 2,4-D, are easily carried by air currents and frequently cause injury to my leaves. Severe injury of this type affected the English elm leaves shown in figure 2. Accidents also occur when my trunk is bumped by lawn mowers, automobiles, tractors, bulldozers, and other implements used by man. These implements frequently knock off my bark or gouge large chunks of wood out of my trunk. It may be many years before I can produce enough bark to cover these injuries and to protect my wood from fungus rots.

Carelessness is a serious menace to me and frequently occurs in laying sewers and building homes and other structures. Dirt may be piled ten to fifteen feet deep around my trunk. This dirt not only compresses the soil around my roots and reduces the amount of air in the soil until my roots may suffocate, but also presses against my trunk and produces an effect of girdling, which slows down the movement of sap and minerals from my roots to my branches. In excavating for foundations and sewers, my roots may be cut off within three to six feet of my trunk as illustrated in figure 3. Such treatment may cause my leaves to turn yellow and fall and my branches to die. Some of my relatives, unable to withstand the shock from such carelessness, have become weaker year after year and have finally died.

Chance is another factor which can be dangerous to me. The present-day trend for many people to build homes in the country and especially in the native woodlands can be rough on any tree. We trees rely on our decomposing leaves and vegetation to supply us with groundcover and food and to maintain an abundance of water in the soil. When the soil is seeded to grass, our roots must compete with the grass to obtain water and food from the soil; therefore, our supply of food and water is drastically reduced, and we are unable to continue growing vigorously. Since we trees may be injured or killed by this treatment, how can you expect the maples shown in figure 4 to grow normally when the poor things have their roots covered by concrete?

Improper care brings to mind many treatments which are supposed to improve my growth and appearance but are not properly done. In pruning my branches, too few or too many may be removed and some may be cut to stubs, as occurred to the trees in figure 5. I have no way of immediately producing a protective layer of bark over the wood exposed on such stubs, and so rot usually develops in the exposed wood. Without my branches and leaves, I naturally send out numerous sprouts to give me more leaves. Most of these sprouts develop around the stubs. However, these fast-growing sprouts, sometimes called water sprouts, grow long and slender and soon crowd each other. Being long and

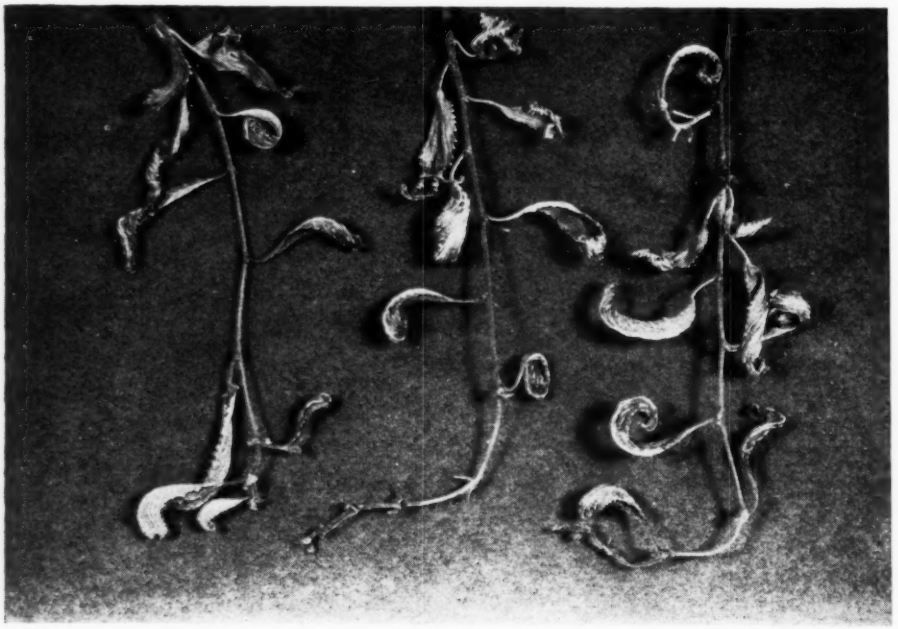
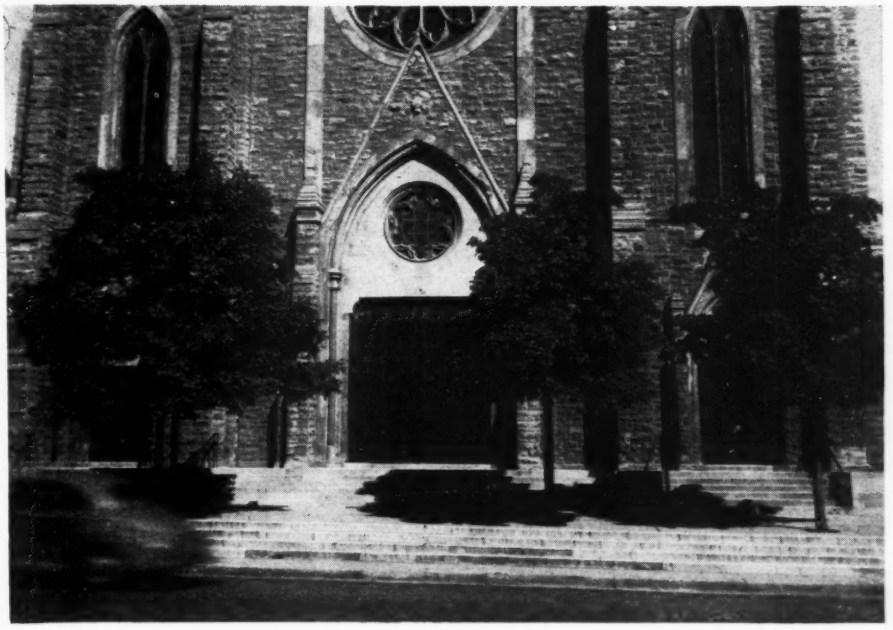


Fig. 2. Severe injury from chemical weed killers, such as 2,4-D, usually appears as curling, twisting, and distortion of leaves and shoots or as abnormal elongation in growth. Some of these English elm leaves are boat-shaped; others are curled like ram's-horns.

slender, they are not very strong and are easily broken by wind and ice. This drastic pruning, frequently called dehorning, is about the most severe shock which I can take and still survive to grow another year. This loss of most or all of my leaves means that I am without any means of manufacturing food, until I get a new crop of leaves. However, proper pruning is a valuable corrective measure by which my dead branches, interfering branches, and other undesirable branches are removed. It improves my appearance, shape and growth. I am able to produce callus rapidly and cover over wounds with new bark, when the branch to be removed is cut at a healthy lateral, or where it is attached to the trunk. When I am properly pruned, I do not have to struggle with any stubs which die back to the nearest lateral and may be attacked by wood rot fungi. As mentioned earlier, these wood rot fungi grow into my trunk wood and produce cavities.

Lack of knowledge on the part of man about my growth and response to various treatments may be fatal as shown in figure 6. Wire fastened around my trunk will not allow me to grow and expand in a normal way, and in time it will prevent my sap from traveling up and down the trunk in the normal fashion. Also, uncontrolled grass and leaf fires which burn around the base of my trunk and kill my bark, cause me a lot of trouble and interfere with the normal flow of sap.

Since I and all of my relatives have plenty of troubles which are not "manciate all of my living days.



troubles," I feel that it is only logical to expect all you nice people to do all you can to help me in my struggle to exist. May I suggest that you stop, look, and think to make sure that the treatment to be administered is beneficial and not detrimental to my life and limbs, and then my "man-troubles" from accidents, carelessness, chance, improper care, and lack of knowledge will be over. In return, I shall grow my best to give you plenty of shade and to fit in with the scheme of things around your home. Well, folks, to tell you about some of my ups and downs has relieved my blood pressure, excuse me, I mean sap pressure. Any help that you can give me in my struggle for existence, I shall appre-

Fig. 4. Trees with their roots covered with concrete are not likely to get sufficient food, water, and air to grow rapidly and develop into beautiful shade trees.

Fig. 6 (above). Girdling by wire, iron bands, and even rope reduces or stops the flow of sap between roots and leaves and frequently causes trees to die, as in the case of this young American elm.

Fig. 5 (left). Improper care, such as dehorning, is a severe shock to any tree and some kinds of trees may not recover. Trees which have the leaves and branches removed cannot manufacture food until new leaves are produced.

If I were planting SHRUBS

By **Ben Blackburn**

Viburnum prunifolium **is esteemed for its superb habit and the effective winter picture of artistic pattern of branches and blue-black fruits**

In such a vast group as the ornamental shrubs, unless very generous space, energies, and resources are all available, a gardener must certainly specialize in comparatively few. Currently popular and alluringly advertised items have a certain appeal, but when new plantings are to be as fully satisfying as conditions permit, it is always desirable to use a few kinds chosen for their merits on many considerations. A list of plants successful in one part of the country differs considerably from a similar list for another area. Even in the same garden, differing soils, exposures, and other considerations make it possible for some shrubs to do much better in certain locations than others. The factors work together in varying ratios, and it is not at all easy to find convincing explanations of some of the results.

The title above is quite specific, however, and personal favorites can be set forth for north-central New Jersey, with the not unreasonable implication that each would hold about the same merit over most of the region around New York City. Winter cold and winds, summer drought, soil conditions, comparative freedom from destructive insect pests and plant diseases as well as from deer damage (a vexingly important item in this area) — all are factors influencing the success or failure of our shrub plantings. Kinds that have proved to be obnoxious and dangerous spreaders by seeds or other means should be excluded at the outset, if one is fortunate enough not to have them already; multiflora roses and Morrow honeysuckles are horrid examples of shrubs against which we wage just as ceaseless warfare as against Japanese honeysuckle and poison-ivy, and none of these can be discouraged for long.

In the final selected list, numerical superiority is held by the viburnums, a valuable group with unusual beauties in flowers, fruits, and habit of growth, which combine to offer superior artistic qualities during two seasons at least, or even throughout the year. The hardy kinds which are considered indispensable here can scarcely be reduced to fewer than seven, and it would be much easier to let them stand at ten or a dozen. Anyone living in their garden through the winter should reserve a special place for Reginald Farrer's cherished fragrant viburnum *(V. fragrans)*, which opens its clustered pink buds from November to April, depending on the weather. Its dwarf counterpart (f. *nanum)* is valuable for special uses, and its best selections are compact floriferous shrubs less than three feet high. For fragrant early flowers, Charles and Bishu viburnums *(V. Carlesii* and its variety *bitchiuense)* are not surpassed, and it seems as difficult to get authorities to choose between their best forms as it is to clarify their botanical status. [Dr. Tomitaro Makino, dean of Japanese botanists and now in his ninety-third year still working industriously, originally described *V. bitchiuense* as a species in 1902. He now prefers to consider it a variety of *V. Carlesii*, from which it is scarcely separable by any constant and clearly defined botanical character.] Doublefile viburnum *(V. plicatum* f. *tomentosum)* is unique in its graceful layered effect in bloom, which some connoisseurs hold equal to that of flowering dogwoods. Though unfortunately not in the American trade, *V. macrocephalum* f. *Keteleeri*, the similar but even more dramatic plant from which Chinese snowball was developed, would be an addition of highest qualifications, and it is hoped that it may finally be available in this country. These last are two of those annoying cases in which the less beautiful sterile-flowered or snowball forms have priority as the botanical species, and the wild plants from which they arose have to be designated as variations — an unnatural, cart-before-the-horse arrangement necessitated by the botanical code.

These viburnums may produce berries in some abundance, but the fruiting displays, though interesting, are rarely spectacular and their principal claims to distinction rest on their flowers, which are all that could be desired. For preeminence in late summer and autumn with brilliant displays of berries and colored foliage, kinds always included are tea viburnum *(V. seti-*

gerum), linden viburnum *(V. dilatatum)*, and American cranberrybush *(V. Opulus* var. *americanum*, and also known as *V. trilobum)*. Following its formal rounded clusters of creamy flowers, blackhaw *(V. prunifolium)* has fruits turning through a series of pink tones before they mature as dark blue. It is esteemed for its superb habit and the effective winter picture of artistic pattern of branches and persisting blue-black fruits which draw the birds.

Other viburnums crowd to be admitted, and it takes great horticultural firmness of character to exclude hobble-bush *(V. alnifolium)*, withe-rod *(V. cassinoides)*, and dockmackie *(V. acerifolium)*. All are magnificent for foliage coloring and have fine blue fruits. Dockmackie is supreme in its claret and pink-to-purple autumn foliage, and it is useful as a filler and supporting shrub. It can be kept at any height desired from three to six feet, and so offers more freedom in habit than most viburnums, which are somewhat set in their ways in this respect. More small forms are needed, and the dwarf form of fragrant viburnum has been mentioned. Dwarf cranberrybush *(V. Opulus* f. *nanum)*, a clonal selection of the familiar European type, becomes slightly larger. It practically never flowers and is valued solely for its very pleasing habit. One more which may be mentioned here, though it just misses making the final list, is Wright viburnum *(V. Wrightii)*, with hard bead-like, brilliant red berries which last nearly half the year. It seems rather difficult to obtain this species now, and linden viburnum often masquerades under its name. The latter has shoots and leaves at once noted to be very hairy, while Wright viburnum has shoots practically lacking hairs and leaves without hairs except along the veins.

Even the many fine viburnums do not fill all the requirements in a garden of shrubs, and mindful of arid summers and problems in watering, one is wise indeed to profit from the many offerings among the brooms and their Pea Family relatives. These require well-drained, fairly open soil and abundant sunlight, and scarcely any shrubs prove more rewarding for dryish sunny locations. They have particular appeal for real gardeners, as nearly all should be raised from seeds and put out in their permanent locations in spring from pots, preferably when two or three years old. Older plants with roots crowded into corkscrews have few chances of surviving winds, and those transplanted from the open ground prove successful only when cut back in the most severe fashion, if then.

Several forms of Scotch broom *(Cytisus scoparius)* are irresistible, especially the lovely pale yellow moonlight broom (f. *sulphureus)*. The hybrid Warminster broom *(C. praecox)* performs very well, and among the other pleasing and floriferous subjects in this genus — excluding the very low kinds which require rock walls or other special situations to let them show to advantage — are *C. multiflorus, C. nigricans*, and *C. sessiliflorus*. Of the genistas or woadwaxen, *Genista pilosa* is a proven favorite, and its wiry interwoven branchlets make low masses quite covered with rich yellow bloom in mid to late spring. Some forms of dyers greenweed *(G. tinctoria)* are decided improvements on the type itself, which is inclined to be weedy and, in fact, is naturalized in some localities. Though there may not be much

Cytisus praecox, the hybrid Warminster broom, performs well

For fragrant early flowers Viburnum Carlesii is unsurpassed

Deciduous Shrubs

Amelanchier canadensis (A. oblongifolia)
Thicket Shadbush
Caryopteris clandonensis
Clandon Bluebeard
Chaenomeles lagenaria f. *nivalis*
White Flowering Quince
Cotoneaster adpressa
Creeping Cotoneaster
Cytisus scoparius
Scotch Broom
Elaeagnus umbellata
Autumn Elaeagnus
Enkianthus campanulatus
Redvein Enkianthus
Euonymus alatus and its Korean form
Winged Euonymus
Genista pilosa
Silky Broom
Ilex verticillata
Black-Alder
Lonicera fragrantissima
Winter Honeysuckle
Paeonia suffruticosa
Tree Peony
Rhododendron Kosterianum
Koster Azalea ("Mollis Hybrids")
Rhododendron Schlippenbachii
Royal Azalea
Rosa Wichuraiana
Memorial Rose
Stewartia ovata f. *grandiflora*
Showy Mountain Stewartia
Syringa Prestoniae
Preston Lilac
Syringa vulgaris
Common Lilac
Viburnum Carlesii, including its var. *bitchiuense*
Carles and Bishu Viburnums
Viburnum dilatatum
Linden Viburnum
Viburnum fragrans
Fragrant Viburnum
Viburnum Opulus var. *americanum (V. trilobum)*
American Cranberrybush
Viburnum plicatum f. *tomentosum*
Doublefile Viburnum
Viburnum prunifolium
Blackhaw
Viburnum setigerum (V. theiferum)
Tea Viburnum

Evergreen Shrubs

Berberis Julianae
Juliana Barberry
Buxus microphylla f. *compacta*
Dwarf Littleleaf Box
Buxus sempervirens f. *suffruticosa*
Dwarf Box
Calluna vulgaris f. *alba*
White Heather
Elaeagnus pungens
Thorny Elaeagnus
Erica carnea (and derivatives)
Winter Heath
Ilex opaca
American Holly
Kalmia latifolia
Mountain-Laurel
Pieris japonica
Japanese Andromeda
Prunus Laurocerasus f. *schipkaensis*
Shipka Cherry-Laurel
Rhododendron carolinianum
Carolina Rhododendron
Rhododendron Russellianum (etc.!)
Catawba Hybrid Rhododendrons

space left, one is tempted to include *Petteria ramentacea*, a valuable hardy shrub with yellow flowers in upright racemes, intermediate between genistas and laburnums. Spanish broom *(Spartium junceum)* is a little too tender for general planting in the New York area, but it is so interesting and the sprays of golden flowers so artistic that one is persuaded to try it in the warmest, most favored spots. (It is blooming here in early July, as these lines are written.)

Established preferences would certainly take me next to the Witch-hazel Family — to the witch-hazels themselves, the fothergillas, the more varied personalities among *Corylopsis*, and the evergreen *Loropetalum*, which is quite able to stand zero temperatures for brief periods. However beguiling all these are, some must be accepted more as curiosities and collector's items than candidates for most garden plantings. Furthermore, just as in the case of magnolias and other favorites, many are actually trees, and they are open to treatment as shrubs only when small or by dint of special handling to keep them small. Many small trees would certainly be featured in any balanced planting of interesting woody materials. There are no straight boundary lines in the plant world, but for convenience shrubs may be defined as woody plants typically with several stems from the ground and usually less than fifteen feet high.

Filling an important place as strong hearty subjects in the same general category for border and enclosure plantings as viburnums are the lilacs — the many species and very many horticultural varieties of *Syringa*. Few shrubs are more dependable and less demanding. They bloom lavishly and make nearly all their growth in midspring when gardens are expected to be at their best and when moisture is adequate for everything. In addition to a few most critically selected single varieties of common lilac *(S. vulgaris)*, one or two of Miss Preston's superb hybrids from Ottawa *(S. Prestoniae)* should be included. As for the garden varieties of common lilacs, among the impressive list of those available at modest prices, I do not see how one can resist Madame F. Morel, Capitaine Baltet, and Ludwig Spaeth. There are dozens of newer ones, however, and more than enough to please all tastes. Some of the famous large collections and nurseries should be visited in lilac-time to make personal selections.

These three groups — viburnums, brooms, lilacs — furnish a sturdy nucleus around which a more diversified selection can be assembled. The other shrubs in the accompanying lists stand very well on their own merits.

THE GARDEN IN SEPTEMBER

Now thin mists temper the slow ripening beams
Of the September sun; his golden gleams
On gaudy flowers shine, that prank the rows
Of high-grown hollyhocks, and all tall shows
That autumn flaunteth in his bushy bowers;
Where tomtits hanging from the drooping heads
Of giant sunflowers, peck the nutty seeds;
And in the feathery asters bees on wing
Seize and set free the honey flowers,
Till thousand stars leap with their visiting;
While over across the path lazily flit,
Unpiloted in the sun,
The dreamy butterflies
With dazzling colors pondered and soft glooms,
White, black, and crimson stripes and peacock eyes,
Or on chance flowers sit,
With idle effort plundering one by one
The nectaries of deepest-throated blooms.

—Robert Bridges

AN OCTOBER GARDEN

In my autumn garden I was fain
To mourn among my scattered roses;
Alas for that last rose bud which uncloses
To autumn's languid sun and rain
When all the world is on the wane!
Which has not felt the sweet restraint of June,
Nor heard the nightingale in tune.

Broad-faced asters by my garden walk,
You are but coarse compared with roses;
More choice, more dear, that rose bud which uncloses
Faint-scented, pinched, upon its stock,
That least and last, which cold winds balk;
A rose it is, though least and last of all,
A rose to me though at the fall.

—Christina Georgina Rosetti

GLOXINIAS — SINNINGIAS

By Peggie Schulz

For a number of years, gloxinias have been recognized as valuable greenhouse or window garden plants — not only because of their wide color range, but also because of their handsome velvety green foliage.

But the florists' gloxinias, the ones most growers are familiar with, are not the gloxinias of botanists! The genus *Gloxinia* was founded by L'Heritier in 1785 on a plant which he named *Gloxinia maculata*. This species, which grows from a scaly underground rhizome, is still in cultivation but it is now known as *Gloxinia perennis*. The leaves on this gloxinia are shiny gray-green above, dull red beneath, and the downy, blue, bell-shaped flowers are borne on foot-long stems. These plants do not make especially good window gardening material but do rather nicely in the greenhouse or in sheltered garden areas. *Gloxinia maculata* is not a spectacular plant and, as it was not popularly accepted, it faded into near obscurity.

In 1817 Loddiges named a related Brazilian plant *Gloxinia speciosa*. One needs, however, only to look at the colored plate of this plant *(Loddiges Botanical Cabinet* 28) to discern the many differences between it and the gloxinia of L'Heritier. Of this handsome blue-flowered plant, this so-called gloxinia, Loddiges writes: "This most splendid subject has lately been introduced from South America. . . . Our plant is at present, June 1817, in fine flower."

In 1825 Nees founded the genus *Sinningia* upon another Brazilian gesneriad. He called this plant with its red-dotted white flowers, *Sinningia Helleri*. Somewhat later botanists discovered that Loddiges' *Gloxinia speciosa* also belonged to this genus and so, according to the code of nomenclature, it became *Sinningia speciosa*, the forerunner of our present-day florists' gloxinias. But to growers the world over it will remain a gloxinia, so I shall refer to the hybrid forms as gloxinias, the species as sinningias.

Sinningia eumorpha — grown by the author

To me *S. speciosa* is a choice window garden or greenhouse subject. One sees its blue or rose derivatives in many collections. This neat-growing plant has softly haired, oblong, green leaves. The throat of the flowers protrudes into what is commonly termed the "slipper-type" and the nodding five-petaled flowers have four stamens. Hybridizing has added to the stamen count, so it is not unusual to find as many as seven or eight stamens on some of the larger forms.

There are perhaps twenty species of sinningias originating from Brazil. Sinningias are tuberous-rooted and belong to the Gesneriaceae. The majority of the species seem to be no longer in cultivation, although I'm certain collectors wish they were!

S. speciosa appears to have a number of varieties. White-flowered *albiflora;* heavy-foliaged, blue-flowered *caulescens (Loddiges Botanical Cabinet* 1566) ; *rubra* with handsome red flowers; *macrophylla,* whose leaves are olive-green, silver-veined, and whose flowers are deep purple. This variety, still in cultivation, is commonly called the Brazilian gloxinia. The one in my collection appears to have narrower flowers than that shown in *Curtis's Botanical Magazine* 3943.

White-flowered, *S. barbata,* with its pouched-out red throat and slender green leaves must have been a beauty. In 1860 *S. concinna* was recorded and

First blooms on a red-and-cream Buell seedling — grown by the author

Sinningia speciosa — somewhat improved by cultivation

a description is to be found in *Botanical Magazine* 5253 under the name *Stenogaster concinna*. This short-leaved plant is described as having red stalks, peduncles, and veins. The flowers are purple above, yellow below.

S. conspicua appears to have been another desirable gesneriad. The corolla was yellow, paler without, and the lower part of the tube marked with purple lines and dots. The leaves were ovate. Discovered in Brazil in 1868, this plant was described in *Flore des Serres* 2423-4 as *Rosanowia ornata*. Dr. Harold E. Moore, Jr., of Bailey Hortorium, Ithaca, N. Y., tells me this will appear in *Gentes Herbarum* as *Sinningia xornata*.

S. guttata was a rather important discovery in that it was to feature in later breeding projects. This plant had pale green, red-dotted flowers.

A great favorite among collectors and window gardeners is *S. Regina*. The one in the photograph, a three-year-old, has olive-green, silver-stenciled, ruby-backed leaves, eleven inches long. Dangling purple bells further enhance this plant.

We do not find much history on *S. cumorpha*, which prior to this time has been incorrectly listed as *S. maximiliana*. We do know, however, that the true *S. maximiliana* was described in 1864 from living plants sent to Europe from Cabo Frio, Brazil. This plant had olive-green leaves, reddish underneath, and purple nodding flowers. We are indebted to Dr. Moore of Bailey Hortorium for giving *cumorpha* a proper name. If I could have but one sinningia in my collection, I believe I would pick this one. The leaves are such a shiny, dark green that they appear near-black, and the flowers are fat little white bells, some having purple lines in the throats, others with yellow streaks and faint purple dashes. *S. cumorpha* has recently become the parent of a bigeneric hybrid, rosy-flowered *x Gloxinera rosea*. The pollen parent was another gesneriad, a *Rechsteineria*.

Plant breeders in the last century were alert to the possibilities of creating new and better gloxinia variations. They were not content with these nodding-flowered plants and worked diligently to perfect them into upright-flowering specimens. One of the earliest recorded crosses seems to have been made between *S. speciosa* and spotted-flowered *S. guttata*. According to L. H. Bailey, "The issue of this cross showed little effect of the *S. guttata*, except a distinct branching habit in some of the plants."

In 1860 a hybrid group, 'Fyfiana,' appeared. The pink, white, and blue flowers were of erect form. A color plate of this plant, which appears in *Flore des Serres*, Vol. 4, page 311, shows a distinct resemblance to the familiar gloxinia 'Emperor Wilhelm.'

In 1866 a Mr. van Houtte named a variety after his wife, Mina. Although the flowers were reported to be a lovely carmine-red, margined white, this was but a more colorful form of drooping-flowered *Sinningia speciosa*. This plant was, however, used with 'Fyfiana' in successful breeding efforts from which came a number of erect-flowered gloxinias.

M. Rossiaud is accredited with the 'Crassifolia' strain, which still is an important florist variety. A few years ago I received a gift packet of this seed from Vilmorin-Andrieux, Paris, France. I grew numbers of these gloxinias to maturity and found that 'Crassifolia' is indeed a sturdy race of good color range.

From the late 1860s gloxinias began their upward climb toward improved color, form, and texture. During the early 1900s, gloxinia breeding seemed to have settled into a groove and nothing new or startling occurred until the late 1940s when Albert Buell of Eastford, Connecticut, presented his spectacular gloxinia originations. These plants differed in that they had been widened considerably, not only as to the face of the flower, but the tube as well.

As gloxinias neared the peak of large-flowered perfection, it is not strange to find the pendulum of flower fashion swinging backward. Many hobbyists began seeking the smaller-flowered slipper types. Mr. Buell, too, fancied this contour and soon placed on the market his improved version of the original *Sinningia speciosa*. These are nodding "slippers" of good size and a glorious color range.

During this period the West Coast

(Continued on page 150)

Sinningia Regina — grown by the author

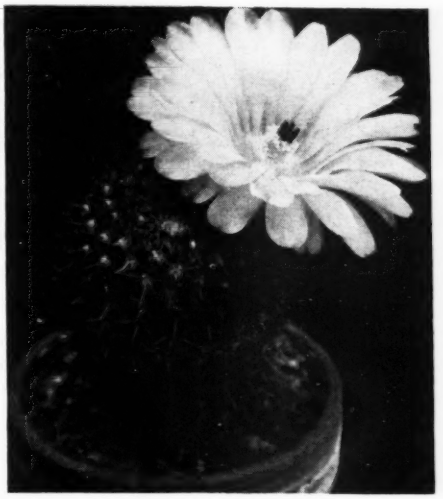
CACTI *and* SUCCULENTS

Here is an interesting and varied selection that will make good window plants

By **E. J. Alexander**

In heated apartments and homes, it is frequently difficult to get plants to remain in good health. The air is dry and ventilation is poor or drafty. If the air can be kept moist, it is possible to grow any kind of plant that does not require too much sun. Usually, however, the amount of moisture needed by plants is not comfortable for humans, and the resultant conditions in most apartments and homes are those of a desert, especially in the winter. The plants most likely to thrive under such circumstances are cacti and succulents, which are accustomed to desert conditions and manage reasonably well in stale air, provided they are given moisture and ventilation during their growing season. Their angular leaves and geometric forms of growth are in keeping with "modern" furnishings; thus they are very much in place in apartments so decorated, but must, of course, be used in or near windows where the light is strong.

Cacti most satisfactory as house plants are more or less limited in number. Most of them require full sun for at least six hours of the day. Many are grown only for the ornament or design of the plant, as only a few will flower under house or apartment conditions. Many in maturity are very large and are suitable for home growing only when small — these will never reach flowering age without the use of a large greenhouse. However, the following will usually flower if kept in a sunny east or south window and given air during the growing season.



Notocactus mammulosus, with golden-yellow flowers, is an easy doer

The "rose-plaid cactus," *Gymnocalycium Friedrichiae,* is the most readily flowered, even when small; its rose-pink blooms open in the afternoon. The "plaid cactus," *Gymnocalycium Mihanovichii,* is almost equally easy; its flowers are greenish yellow or brownish. Dams' chin cactus, *Gymnocalycium Damsii,* with white flowers, and Quehl's chin cactus, *Gymnocalycium Quehlianum,* white with red center, are also good bloomers. Most striking of all is the red-flowered *G. venturianum.*

Notocactus mammulosus is an easy-to-grow cactus with golden-yellow flowers. There are numerous other kinds of *Notocactus.* Three particularly attractive are: *N. Scopa,* the snowball, covered with fine bristly white spines, the central spine of each group brown; and *N. Schumannianus* and *N. Graessneri,* both called golden ball, and both covered with bristly deep yellow or old gold spines.

Parodia is also a satisfactory group. The "Tom Thumb" cactus, *Parodia aureispina* is the most dependable for flowers. Its flowers are golden-yellow.

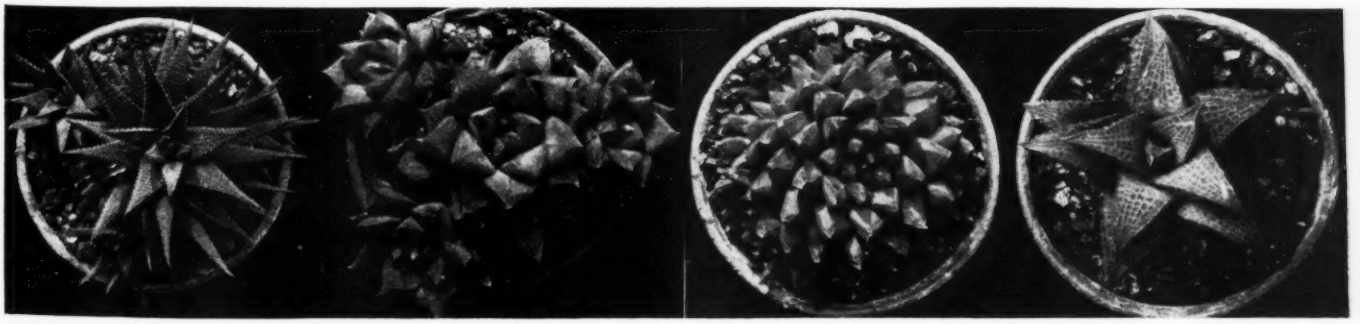
Rebutia is another early flowering group; *R. minuscula* with red flowers and *R. violaciflora* with rosy purple ones are the most common.

The "Easterlily" cacti, various species of *Echinopsis,* with quite large flowers which are white or light pink, are reasonably ready bloomers, provided they have good sun.

The "pin-cushion" cacti, *Mammillaria,* of which there are about three hundred different kinds, have some free bloomers among them but the flowers are small, although many are bright-colored. The number one "Mam" for city homes is *M. elongata* in any of its varieties. Its straw-colored flowers are not often produced in the home, but the plant itself is as attractive as a flower, its finger-like branches being covered with radial clusters of pale yellow spines. Other good mammillarias are: *M. elegans, M. tetracantha, M. bombycina, M. Hahniana, M. candida, M. fragilis, M. multiceps, M. decipiens, M. bocasana.* The first five are red-flowered; the last four have creamy or straw-colored flowers.

The prickly-pears and chollas, both of the genus *Opuntia,* are not recom-

Among the best succulents for an east window of an apartment or home are these haworthias



mended for home culture, as they are dangerous to handle and require too much sun. One of them, however, is perfectly safe and also highly ornamental. This is the white-spined form of *Opuntia microdasys*, called *Opuntia microdasys* var. *albata*, whose spines, while they stick to the fingers readily, may be brushed off by just rubbing the hands together; and the spines have no ill effects. A word of warning, though, about *O. microdasys* and *O. rufida*, often sold under the name of "bunny-ears." They are very dangerous plants to handle, as the spines come off easily, stick in the fingers and hands, and cause painful irritations and sores. Do not grow them.

Lithops bella, right, and *L. optica*, left, are among the most perfect of the stone-mimickers

Of other succulents, the best for home conditions are species of *Gasteria* and *Haworthia*. These plants are best grown in east windows, as their leaves turn yellowish in the sun of southern or western exposures. They are very hardy plants and look their best during the winter months, which are their growing time. They grow best in soil two-thirds loam and one-third sand, with some leafmold, and require watering every third day from September to May, and once every two weeks in June, July, and August, as that is their rest period. Since the gasterias are all very much alike in form and flower, any of them that do not grow too large are suitable as house plants.

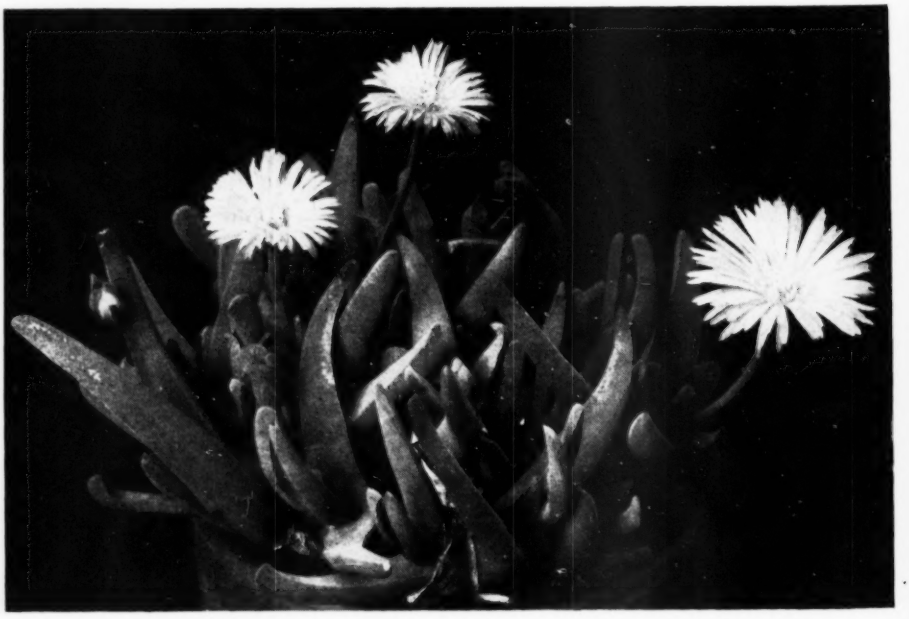
Haworthias, on the other hand, while all of small size, have greater variety of form and markings. There are kinds which have dark green leaves with white tubercles; these are the most popular, and they have two forms of growth, one a dense rosette, the other cylindrical. Of the rosette forms, the best are *Haworthia fasciata*, *H. attenuata*, and *H. margaritifera*; of the cylindrical forms *H. Chalwinii* and *H. Reinwardtii*. There are also kinds with pale green leaves, some of which have translucent windows on the upper parts of the leaves. Of these, the best are *H. cymbiformis*, *H. pilifera*, and *H. setata*. A neat little cluster-forming one is variously sold under many different names, the most common being *H. atrovirens* and *H. translucens*.

Of the hundreds of species of *Aloe*, only a few are sufficiently small for use as house plants. The finest of all is the "partridge-breast," *Aloe variegata*. It is not too easily kept in good health, but has a reasonably long life if watered only sparingly. Somewhat more easily handled are *Aloe humilis* and *A. brevifolia*, both with blue-green, spiny-tubercled leaves. Two larger growing ones are the bushy *A. arborescens* and the half-climbing *A. ciliaris*. All of these plants have red or orange flowers in heavy spikes.

A very large group of plants in the Stonecrop Family is also fairly popular as house plants. The most commonly grown is *Crassula argentea*, under the name of jade plant, Mexican rubber-plant, or Japanese rubber-plant. It is a native of South Africa and is no relation to any kind of rubber-plant. There are some five hundred other kinds of *Crassula*, covering the entire range of plant forms, all of them succulent, and any of them suitable for house plants where there is good light. Two of the more popular ones are the red-flowered *C. falcata*, whose bluish gray, sickle-like leaves spread into a flattened fan-like growth, and *C. perforata* with paired leaves completely encircling the stem, and with a hanging form of growth, making it suitable for window shelves or hanging baskets. *C. tetragona*, which looks like a small pine-tree, is also popular, as is *C. lycopodioides* with its bushy moss-like growth.

A few kinds of *Cotyledon* are grown — these have large, bluish, paired leaves and bear, at the top of a long stem, pendant, tubular, coral-colored flowers.

All of the preceding plants of the Stonecrop Family are South African,



Cheiridopsis rostrata has attractive yellow flowers

Paradia aureispina may be depended on to flower

Gymnocalyciums are easy doers and good bloomers

Rebutia minuscula bears its red flowers freely

but there are some American members of this Family. Of these the most attractive are the kinds of *Echeveria* with rosette forms of growth, leaves green, grayish, or tinted with metallic shades of purple, lavender, and reddish. Their flowers are bell-shaped, on long arching sprays, and are usually red or orange, with yellow tips. A few have a bushy form of growth with upright spikes of flowers.

The Mexican kinds of *Sedum* are also used — these have bushy forms of growth much like the crassulas, but the leaves are not paired.

A third group comes from the Canary Islands and belongs to the genus *Aeonium*. They are big saucer-like rosettes raised on thick stems.

Whereas crassulas grow reasonably well in poor light, none of the other members of the Stonecrop Family may be expected to grow well without at least six or eight hours of sunlight. Echeverias, sedums, cotyledons, and aeoniums are not satisfactory house plants without the required sun.

In a sunny window, south or southeastern exposure, it will be possible to grow the stone-mimicry and windowed plants. These plants from South Africa are not difficult under the proper conditions, and being small, they may be grown several in a pot. They must have rather sandy soil, some lime, one hundred percent drainage, and no more than token watering when they are dormant, or they will rot overnight. They have two growing periods, in the spring and in the autumn. The flowering period is usually autumn, although there are a few which flower in the spring. The main rest periods are June, July, and August, and November to March. During the winter period, it is advisable not to water them at all; a little water twice a week is safe during the hot summer period.

Several kinds are offered by growers, and all are attractive with yellow or white flowers as large as or sometimes larger than the plants. These flowers open for several hours every afternoon for about a week; a few are night-blooming. The genera most commonly grown are *Faucaria, Pleiospilos, Cheiridopsis,* and *Herreroa*. The faucarias have sliver-like leaves with backward-pointing, fringe-like teeth; pleiospilos have a rounded pair of leaves, sometimes appearing like a dark green pebble split down the center, at other times two oblong leaves separated by a wide V. Cheiridopsis are green or blue-white in color, with two small outer leaves and two long, upright, finger-like leaves pressed tightly together; herreroas are tiny shrubs with several leaves like moosehorns.

If one wishes to try a hand at something a bit more difficult, specialty dealers can supply many kinds of *Lithops*. These plants are the most perfect of the stone-mimickers, whose two leaves are flat-topped and united into a single body with a cleft on top. They are, however, very intolerant of overwatering and must be kept in full sun. In fact, lithops and pleiospilos should have only their roots in soil, and the lower part of the plant body in pure sand or gravel.

Pleiospilos Bolusii, one of the stone-mimicry plants, may be grown in a sunny window

Something should be said here about the plastic pots, in which so many small plants of cacti and succulents are being sold at present. Firstly, plastic pots are satisfactory, provided they have holes for drainage and are of adequate size for the roots of plants. To take care of the non-porous character, simply give less water. The tiny pots, an inch and a half or less in diameter, are also all right for seedlings or small cuttings. The plants can grow in these small pots only about six months to a year and then, unless moved into larger pots, they will die either from starvation or rot. The pots are too small to hold enough soil for food, and constant watering, after the pot is filled with roots, causes rot. If one wishes only a temporary ornament, well and good; but if a healthy, growing plant is wanted, the plants should be removed from the midget pots and placed in proper receptacles.

Cacti and succulents, as are all plants, are subject to damage and even death by insect pests and fungus diseases. Plants attacked by fungus or rot rarely, if ever, survive. It is best to discard them under house or apartment conditions. There are three kinds of insect pests, which are easily controlled if they are treated as soon as they appear. Red spider (a mite) is destroyed by the use of "Aramite."

(Continued on page 153)

James W. Parris

DISCOVERER OF SUGARCANE SEEDLINGS

By G. K. Parris

In his article, "Sugarcane Breeding in Barbados," in British Agricultural Bulletin, 1952, Sir John Saint says, "Before 1888, no one had attempted to raise new varieties of sugarcane from seed in any systematic manner. A Barbados planter, Mr. J. W. Parris, had reported in the local newspaper of February 8, 1859, that he had raised seven canes from seedlings which had been found growing in a field of ratoon cane. Subsequently, other persons in various parts of the world reported similar findings [in June 1888, Soltwedel announced the fertility of sugarcane in Java] and, in 1888, J. R. Bovell commenced the raising of such self-sown seedlings in Barbados."

Noel Deerr, in *The History of Sugar,* states, "The fertility of cane seed was definitely established in Barbados, in May 1858, when an employee of Highland estate, Iran Aeus, of African ancestry, saw and recognized cane seedlings growing in a field of ratoon cane. He called the attention of the owner, James W. Parris, who put on record the observation in a letter to the 'Barbados Liberal' of date February 8, 1859. Although the announcement by Mr. Parris was copied into the 'Produce Markets Review' and into the Australian press, it attracted no attention and the matter was forgotten." Deerr gives an inaccurate reproduction of this letter, though none of the errors or omissions is of too great import.

J. B. Harrison and John R. Bovell re-discovered sugarcane seedlings in Barbados. They reported, ". . . having obtained the growth (in 1888) of some seventy or more seedlings, self-grown, . . . we now have sixty plants under cultivation showing promise of several varieties." These sugarcane seedlings had been observed by J. B. Pilgrim, an overseer at Dodds Reformatory, who found the "fine grasses" springing up on the farm near a planting of a number of varieties of cane. From this re-discovery was initiated the fine breeding work with sugarcane in the West Indies.

Harrison and Bovell also state in their report of the results obtained in the experimental fields at Dodds Reformatory, Barbados, that several Barbadians set about immediately following the release of Mr. Parris's discovery to test the truth of the report. They attempted to raise cane seedlings from seeds of the arrows (flowers) of the plant. Among the people mentioned is T. Clarke, of Canefield plantation. Thomas Clarke had married one of J. W. Parris's daughters and purchased Canefield with the financial help of his father-in-law. The lands of Highland and Canefield sugar estates then, as now, lie side by side. It is not known exactly where Tom Clarke found seedlings growing from a fallen cane arrow, but it is likely he found them near where Parris discovered the seedlings that he was able to raise to maturity. Clarke, however, never successfully carried out this final step, nor did anyone else until Harrison and Bovell succeeded in doing so. A Mr. W. Drumm even doubted that anyone had grown sugarcane from seed. Harrison and Bovell reported two persons, a Mr. Carter of Bridge Cot and J. Wiltshire Clarke (no address given), as being able to germinate cane seeds, but these Barbadians attached no importance to the results.

Parris was given credit for finding sugarcane seedlings by Harrison and Bovell who wrote, "Attention here was first strongly directed to this point in 1859 by the Honourable J. W. Parris, who succeeded at his estate, Highlands *(sic)* in St. Thomas' parish in rearing successfully self-grown seedlings and in order that credit should be given to the pioneer in the branch of research, we have obtained the account given by Mr. Parris in a local newspaper in 1859 of his discovery." Their reproduction is more accurate than Deerr's and contains only one error in quotation.

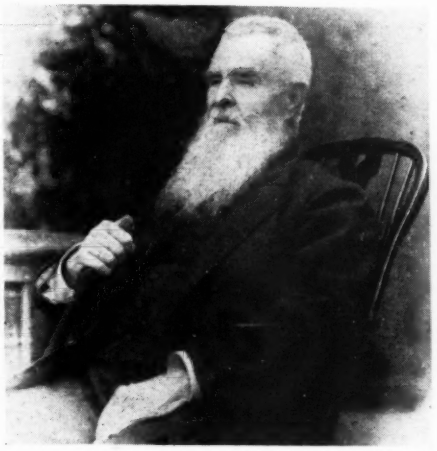
The editor of the Barbados Liberal" newspaper in 1859 was Samuel J. Prescod. His name has never been mentioned before in connection with the Barbadian discovery of cane seedlings, but it should be linked with that of James W. Parris. It was Prescod's penchant for spotlighting the unusual that caused Parris to write him about his findings. Otherwise, the discovery might have been available only by word of mouth, passed down from generation to generation within the Parris family. [I found it difficult to learn much about these events from my relatives in Barbados. They know the general location where my great-grandfather found the sugarcane seedlings, but, until I read the letter that Parris wrote Prescod, details were open to family argument.]

Hearing queer rumors, Prescod asked Parris to relate the truth concerning the discovery of sugarcane seedlings. Parris, writing from Glendale, one of the many sugar estates he then owned, and dating his letter February 8, 1859, replied, "In accordance with your request, I now send you the following particulars regarding the canes established from the seed, and which are now growing on Highland plantation. I think it was somewhere in the month of May last year, that my attention was called to the fact that there being several cane plants growing in a field of ratoons, which the Superintendant pronounced as having grown from the seed of the cane arrow. On first examination, I thought it was a mistake, they bore so close a resemblance to guinea-grass when it grows from seed; but as there was not any of this kind of grass growing on or near the field in question, I could not account of its presence there, and this circumstance caused a stricter examination on my part, the Superintendant, all the while, declaring positively that they were veritable canes. After being satisfied myself that they were really canes, I caused all that could be found to be removed and transplanted to another field, but in consequence of the

weather being very dry, I could only save seven plants of them, and these are now alive and are growing. I intend having the plants from these put in on a spot by themselves this year hoping to obtain seed from them again. The field in which they grew is in that part of the Estate [Highland] which runs down a hill into Scotland; the soil is very moist and is composed of clay, siliceous sand, and chalk, and had been the year previous thoroughly tilled, and was in what we planters call 'fine heart,' that is, in a finely divided and pulverized state. The parent canes were very vigorous, and there were several varieties growing together in the field. [Deerr omits this sentence.] It appears as if there are seed from three kinds growing, the Bourbon, Transparent, and Native; that is, the plants which are growing have the appearance of these at present. [Author's note: Noel Deerr gives ". . . It appears as if they are the seed from these kinds: The Bourbon, Transparent, and Native," while Harrison and Bovell give ". . . It appears as if there are seed from these kinds growing . . . the Bourbon, Transparent, and Native."] I would also remark that these plants were not found growing in one spot but were scattered over a space of more than half of an acre and grew up wherever the trash did not cover the land thickly. Any further information that you or any other gentleman might require concerning the above, I shall be most happy to afford, as far as I am able, or to shew the plants as they now stand."

Prescod's comment on the letter was prophetic. "A discovery appears to have been made last year at Highland plantation in the parish of St. Thomas, the practical importance of which, should circumstances tend to verify it, can scarcely be overrated in any agricultural point of view." One wonders what agricultural training prompted him to think so!

How was my great-grandfather convinced by the superintendent, whose name was Iran Aeus Harper, not Iran Aeus as given by Deerr, that the seedlings were those of sugarcane and not of guinea-grass? Why was Harper so positive? I asked this question when I visited Barbados in 1953. The eighty-year-old grandson of Parris, named after him James William Parris, talked with me on the subject. With him I went to visit the ninety-year-old son of Iran Aeus Harper. Harper was not at home, but my relative told me the story as he had heard it from his grandfather. Harper plucked a leaf from the seedlings and said to his master "Run ya finga 'long de edge of de leaf; de guinea-grass leaf doan have no sharp edge; de cane leaf do and dis one dat way." Harper had been appraising the quality of the weeding job done by the plantation laborers. The "bossman" would be checking on him as well as on the weeding gang. Harper could have ordered the seedlings chopped-out, but recognized that they were not of guinea-grass.



James W. Parris. This picture and the one on page 146 show him at seventy-five to eighty-five years of age.

James W. Parris was forty-four years of age when he reported his discovery in the "Barbados Liberal." On March 18, 1859, his letter was reprinted in the "Barbados Agricultural Reporter" and aroused the comment. "We cannot refrain from congratulating the country on there being found at last a Planter who has overcome the reluctance of the race to figure in print and communicated to the public an interesting fact within his own experience. We have not the slightest doubt that there are many gentlemen in the position of Mr. Parris equally able to give most valuable information to their brethren from time to time, if they would only follow his good example and take the trouble to disseminate stores of knowledge which are of no use when hoarded up."

We turn again to Harrison and Bovell to learn what happened to the seven cane seedlings saved by Parris. "Mr. Parris has recently (1889) stated to us that he finally succeeded in planting four and a half acres with canes raised from these original seedlings, and that he estimated their yield of sugar at over 4 hogsheads to the acre. He however from certain objectionable characteristics which arose in the canes finally abandoned their cultivation and did not again turn his attention to the subject." What were these "certain objectionable characteristics?" In my family the answer is that the canes lodged badly and took root where the stems touched the soil, making harvesting very difficult.

Harrison and Bovell gave names to the seedlings that they discovered. Among the names are those of old Barbadian families, such as Clarke, Parris, Connell, Hutson, Yearwood, Phillips, Shepherd, Jemmotte, and Edwards. Within five years it was evident that none of these varieties was worth saving, and they were discarded. Subsequent varieties developed in Barbados were assigned differentiating numbers rather than names.

What is known about James William Parris? The accompanying pictures show him at seventy-five to eighty-five years of age; they are the only pictures of him in existence.

Parris was born November 18, 1815, near Dunscomb, in the parish of St. Thomas, Barbados. He never left the island. He was brought up in the home of Dickie Bullen, believed to have been a distant relative, who seems to have adopted the boy at a very early age. Parris received little schooling. We hear of him working, at the tender age of ten, as turnkey at a sugar plantation near his home. His employer's name was Greenidge. Details are lost, but this much is remembered by those alive today. Young Parris was so short that he stood on a large stone before each door to insert keys into locks. My great-grandfather rolled the stone from door to door, probably five or six doors. What other labors he had to perform on the plantation we do not know, but we hear of him seeing a swarm of bees, hiving them, and later collecting the honey. For cutting his own honey, he received a flogging from Greenidge!

Greenidge must have recognized the latent character and evident energies

of the lad for he sent Parris to manage a nearby plantation when he was only fourteen years old.

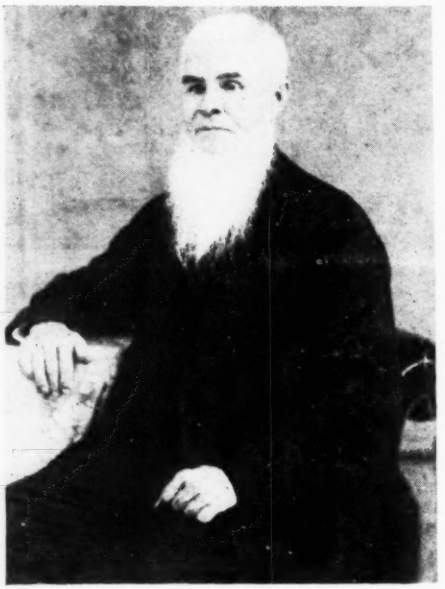
Below average height, about five feet six inches tall, of powerful physique, Parris possessed remarkably good health until just before his death. He never lost a tooth except one which the dentist "pulled by mistake!" No one in the Parris family remembers the "Old Man," "Old J.W.," or "J.W.," as he is affectionately referred to, without a beard. "J.W." married a distant relative, Bettina Bullen, and they raised ten children, six boys and four girls.

Slowly but surely Parris learned the sugar planting trade, moving from one plantation to another as manager, each time, we presume, bettering himself. He is remembered as manager of Parks plantation in St. Andrew parish and as manager of the Pine plantation in St. Michael. At the Pine he had so violent a quarrel with the owner that he resigned.

Parris rented a small piece of land with a shop on it, at Glendale, in the parish of St. Thomas. So, he returned home [he was about thirty years old] and spent the rest of his life in St. Thomas. What Parris sold in the shop and what sort of living he made are guesswork. Today, such a shop, vulgarly referred to as a "grog-shop," sells sugar, rum, firewood, coal, kerosene ("coal-oil") biscuits, flour, bread, matches, pins, cotton thread, and so on. To make a living must have been hard, for most of his customers were poor whites or negro plantation laborers.

How long did Parris endure this sedentary life? We do not know. However, knowing his driving character, his ambitious nature, and his love of the soil, we cannot imagine him behind the shop counter for any length of time. Maybe he left the shop-tending to his family, while he sought other ways to earn a living, for he found his first love again, sugar planting, and he bought Glendale plantation with the financial assistance of his father-in-law, George Bullen. In addition to growing sugar at Glendale, "J.W." operated a lime kiln there. The burned native rock provides a high grade of lime for "white-washing" the outsides of tropical homes, for sanitation spraying, and for building and agricultural purposes. Parris is said to have made a good living from the lime kiln.

About this time Hopewell plantation, on the hills above Glendale, was purchased by Hutson Inniss, who approached Parris and asked him to manage it. Parris reluctantly agreed to do so. He reaped Glendale's crop of sugar with Hopewell machinery. Hopewell prospered and Parris was asked to undertake the management of Vaucluse and Rugby, other plantations



James W. Parris

in St. Thomas. Lears plantation in St. George parish also came under his guiding hand, and soon Parris was performing the great task of simultaneously managing some ten sugar plantations. People wondered at his ability to cover the area and his apparent ease of concentration on one plantation at a time. Transportation was slow, by horseback or by horse and buggy. Some of the sugar estates were in the lower lands of Barbados and some at the nine hundred to one thousand foot elevation. "J.W." spent hours on the road, and maybe therein lay his secret of success. He planned as he traveled.

About 1855 Parris purchased Highland plantation. This alarmed his friends, while his enemies and rivals rejoiced. At last, they felt, he had overstepped himself; Highland had ruined every previous owner. It did not have such ruinous results in his case. Parris assigned one of his sons to manage the estate, and he followed this policy in succeeding years, as he purchased plantation after plantation. One of his six sons, or a son-in-law, was quickly started in the planting life on a "J.W." purchase. He later acquired Lion Castle, Dukes, Fortress, Ayshford, Lears, Walkers, and other sugar estates, and in 1883 he is said to have been worth £200,000 (almost a million dollars, U.S.A.). Highland still is owned by a member of the family (a grand-daughter) and yields profitably.

That the old man had plenty of spunk is oft illustrated in Barbados reminiscences. Many are the stories told of his great courage, including one where he defied a mob, and also the Governor of Barbados, to keep an innocent son out of custody on a false charge of murder.

Parris entered politics and represented his parish in the Barbados House of Assembly for many years. The start was not easy to accomplish. Residing in St. Thomas, he offered himself for election there, but was defeated by a candidate named Marsh, whose slogan was "Vote for Marsh or pay your bills." Parris contested the legality of the result and was attacked by angry voters of the opposition. He escaped injury by jumping on his horse, whirling the animal in a circle several times, and galloping off as the mob scattered. In the next election Parris was elected from the parish of St. Andrew, where he owned Walker's plantation. Later he became a member of the House of Assembly from St. Thomas parish and was re-elected each year thereafter until 1882, when he was nominated to that higher legal body, the Barbados Legislative Council.

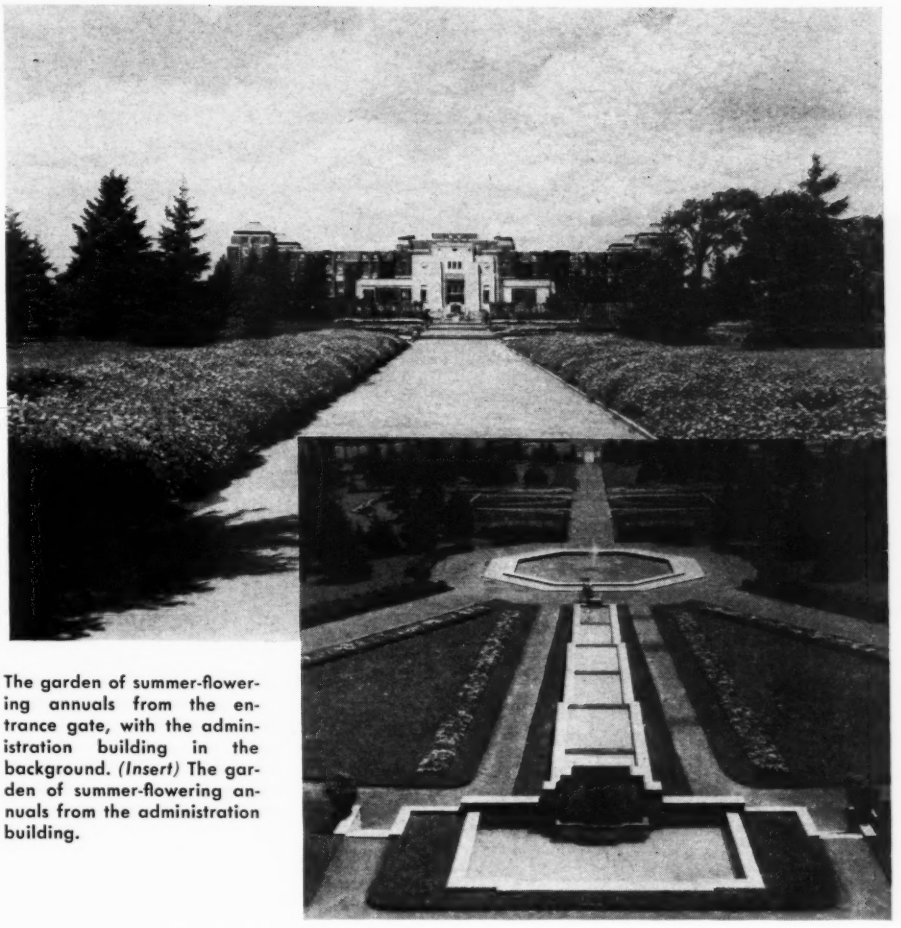
Parris was not only a successful sugar planter, but also a builder of fine roads, bridges, public buildings, and private homes. He built the Barbados Lunatic Asylum and the Lazaretto (leprosy) and most of the roads in St. Thomas parish. As he grew older, Parris assigned his sugar lands to his children. He died at the age of ninety-three on July 20, 1908, at Ayshford plantation, less than two miles from where he reported finding the sugar-cane seedlings. He is buried in the churchyard of St. Thomas' church, surrounded by fields of green sugar-cane.

What did people think of James W. Parris? The "Barbados Advocate"

(Continued on page 151)

THE MONTREAL BOTANICAL GARDEN

By **H. Teuscher**



The garden of summer-flowering annuals from the entrance gate, with the administration building in the background. *(Insert)* The garden of summer-flowering annuals from the administration building.

THE success or failure of a botanical garden — or, for that matter of any institution involving the expenditure of public moneys — is always dependent on two important initial steps. The first is to create public sentiment in favor of the project as well as to secure the required funds. The second is to design, to build, and to organize the institution. There can be no doubt that the first is by far the most difficult hurdle to surmount and the one which causes most failures at the very beginning. Designers and builders can always be found.

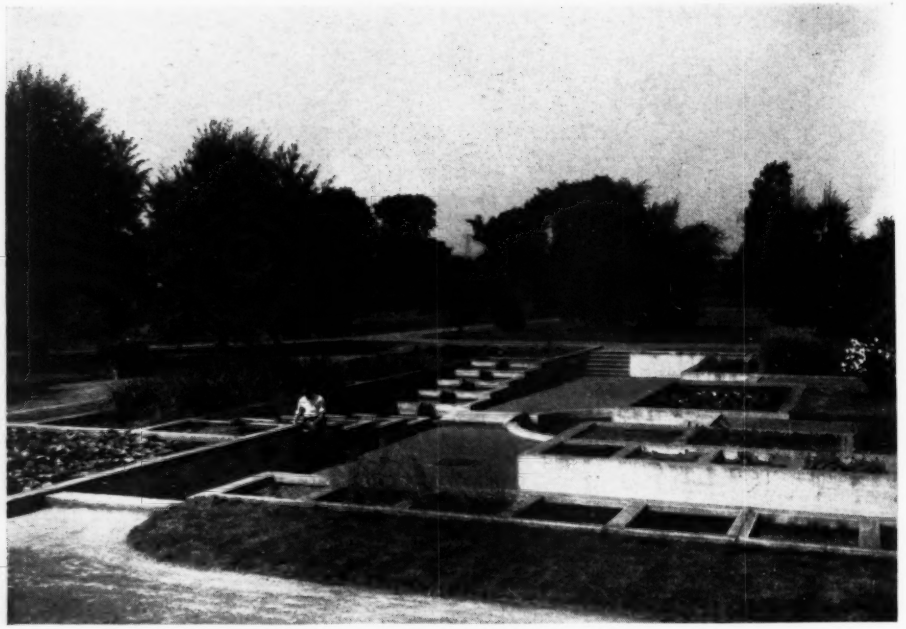
The founder of the Montreal Botanical Garden, without whom it probably never would have materialized, was Frère Marie-Victorin, Dr. and Professor Marie-Victorin, who was also the founder and first director of the Botanical Institute of the French University of Montreal. He was a Catholic Brother of the "Ecole Chrétiennes," but he was also a great scientist as well as a very wonderful person and the best friend any man could have. His untimely death in 1944, caused by an automobile accident, was an irreplaceable loss. Being widely known as well as beloved, respected, and trusted, he was able to muster the support of the public as well as of the civic and provincial authorities. The gentle but irresistible strength with which he countered all opposition had its source in his absolute selflessness, combined with unquestionable sincerity and integrity.

It was my privilege, the greatest of my experience, to be chosen by Frère Marie-Victorin to design and to build the garden of his dream as well as to organize its staff. The main aim of this garden, as Frère Marie-Victorin visualized it, was to serve the general public, not only as a storehouse of botanical and horticultural knowledge, but also as a source of inspiration in garden beauty and of information on all problems concerning practical gardening. In addition, the garden was to provide all required facilities for scientific study and research which any complete botanical garden must include.

My first interview with Frère Marie-Victorin, in which these aims were brought out and agreed upon, took place in 1932, the year in which the City of Montreal first set aside a two hundred and forty-acre tract of land for the establishment of a botanical garden. 1932, therefore, must be considered as the foundation date of the garden, though actual construction work did not commence until 1936. A small pavilion and a heating plant to serve it, which were erected during these fours years, were demolished when the present administration building was constructed.

During the four-year interval from 1932-36, while I was waiting to be called to Montreal, I concentrated first of all on preparing a comprehensive outline of everything a botanical garden with such wide aims might consider to include. I felt that it would be impossible to make a wise choice of features without having an ideally complete program, and this outline indeed served me later on admirably to avoid many errors. Friends to whom I showed it encouraged me to have this outline published, and it appeared first in 1932 in "Parks and Recreation" (official organ of the American Institute of Park Executives) as well as in the "Journal of The New York Botanical Garden" under the title, "The Botanical Garden of the Future." In 1940, it was revised and reprinted by the Montreal Botanical Garden under the title, "Program for an Ideal Botanical Garden." The latter is still available on request.

When I came to Montreal on May 1, 1936, to commence the construction of the garden, I brought with me a number of preliminary designs and sketches, and I devoted the first five months almost exclusively to the completion of detailed working drawings. I worked almost feverishly, even on Sundays and holidays, because I real-



The water- and bog-garden

ized that there is no better argument for a new project than complete designs. Besides, I was anxious to make sure that the rather common error, of commencing construction in one corner before the whole layout is agreed upon, would be avoided. Especially with botanical gardens, where funds in the beginning are likely to be low, this mistake has often been made, and serious faults in the finished layout of a number of existing botanical gardens can still be traced to such a wrong start.

As it turned out, it was most fortunate that I worked so hard on my drawings, because in October 1936 the government of the Province of Quebec decided to undertake public works for the relief of unemployment. Since by that time we were well prepared, this gave us our chance, and the construction of our garden got under way with a flying start. Until the fall of 1939, when war broke out, we had as many as two thousand men at work, and the layout then was almost seventy-five percent completed, including a large and fully equipped administration building. The latter, by the way, contains not only offices but also lecture rooms, a large auditorium seating five hundred people, herbarium and library, laboratories, photographic studio, seedroom, record room, and so on.

Twenty service greenhouses had also been built. These as well as five additional greenhouses, built in the meantime, are now filled to overflowing with very fine collections of tropical and subtropical plants from all parts of the world. The grand total of species and varieties now cultivated by us, outdoors and under glass together, amounts to over twelve thousand.

Only the foundations of our large conservatories were constructed before the war, but preparations are now under way to complete this summer the central section of these show houses. The city of Montreal, which owns and maintains our garden as part of its public park system, contemplates adding other sections from year to year until in four or five years the whole extensive layout, seventy-three thousand square feet under glass, will be in operation. This is almost exactly twice the glassed-in area of the service greenhouses.

Because of our devotion to public service, much attention has been paid to park beauty in the layout of the garden itself. In consequence, many people visit our garden for the first time merely because it is the most beautiful park in the city. They come to relax and to enjoy; but once there, they soon become interested in the instructive information offered with our various displays. This, of course, is our object. "Beauty as an incentive on the road to learning" has become our watchword.

The two hundred and forty acres of land, which the city placed at our disposal, were almost completely flat, containing few scattered trees and providing no scenic interest whatsoever. Therefore, it was decided to arrange most of the plant displays in a series of formal gardens. This plan offered a distinct advantage in that it facilitates the finding of any particular type of plant a visitor may be looking for. Only the alpinum and a number of ecological groups of native Canadian plants, which occupy the center of the garden, as well as the Arboretum and Pinetum, covering the whole northern quarter of the property, are entirely informal.

Partial view of the display garden of ornamental perennials

The monastery section of the medicinal garden

In front of the administration building is located the terraced garden of summer-flowering annuals, providing a brilliant, yearly changing display of some of the newest and most commendable varieties in carefully composed contrasts and harmonies. Not only does this garden give inspiration to home-owners — and, incidentally, also to our other city parks — but it serves at the same time as a sort of show window. Being located in the corner formed by two main thoroughfares, it can be seen clearly from both streets, and many passing motorists, made curious by this brilliant splash of color, come back for a closer look.

To make such a selection of "bests" possible, we test every year several hundred new varieties in a trial field located on another part of the garden, and records of their performance are kept on file. In this manner we have tested during the past fifteen years, thousands of varieties from many countries, and, since we continue to grow these until all their virtues or faults are uncovered, our records are very complete, enabling us to supply authoritative information to anyone who may inquire.

We proceed in the same manner with vegetables, so that our garden of economic plants likewise shows always an up-to-date selection of those vegetable varieties which can be most highly recommended for this part of the country. In addition, we arrange every fall an exhibition of all the varieties of vegetables we have raised, distinguishing with golden stars those which have given the best results. The "Economic Garden" contains altogether some five hundred and sixty-five kinds of plants used by man in all parts of the world, including fiber, oil, dye, fodder, perfume, condiment, and cereal plants as well as leaf, fruit, root, and grain vegetables.

Our display garden of ornamental perennials — like the "Economic Garden" divided into sections by hedges — contains also only selections of some of the best iris, asters, phlox, peonies, etc., altogether over 1,100 varieties. The collections from which these selections are made remain in our large nursery, and new varieties are added there every year. Any new varieties, which after a trial period show superior qualities, replace inferior ones in the display garden, so that here also the selection is kept up to date.

Our "Medicinal Garden" is divided into five sections. One, representing a cloister garden, contains the plants used medicinally in Europe during the "Middle Ages" before America was discovered. The second, forming the background, is planted naturalistically, including a pond and a small creek, and contains the plants which the American Indians employed to treat illness before the coming of the white man. The other three sections contain, respectively, the medicinal plants still in officinal use, the most important plants employed in home remedies, and poisonous plants — other than those of medicinal value — including the most common hay fever plants.

Other garden-like arrangements include a formalized rock garden; a garden of fruit trees and small fruits; a separate garden of fruit trees on dwarfing stock, with which we are experimenting; a water- and bog-garden; and a garden now being developed which, when completed, will contain the plants used by the Amer-

The formalized rock garden

The school children's gardens

ican Indians for food, fiber, and so forth, before white men came to this continent.

Still in preparation are a hedge garden [this was started this spring]; a genetic garden, demonstrating the principles on which the plant breeder has to base his work; a physiological-morphological garden, showing plant shapes and growth habits; and a taxonomic garden, arranging plants according to relationship.

Three sample layouts for small backyard gardens (40 x 50 feet) were designed and constructed this spring. These will demonstrate possibilities to owners of family-unit houses on small lots which presently are being built in large numbers all around Montreal.

The layout of our garden furthermore includes a children's playground, a picnic ground, and a series of two hundred small plots with a cottage-type service house, where every year some three hundred school children receive instruction in gardening.

The educational efforts of our garden extend from a beautiful and much frequented kindergarden, where natural history is taught to children from four to six years of age, to adults who are offered a series of courses on practical gardening. School children visit our garden regularly in class groups which we furnish with a guide. A school for apprentice gardeners provides a three-year period of practical and theoretical training. Our auditorium, which throughout the winter months offers every Saturday afternoon a free educational movie to children, is at other times a favorite meeting place of scientific or semi-scientific societies. Our scientific efforts which are not mentioned here extend, of course, to all phases of botany and scientific horticulture, as does the work of all serious botanical gardens.

Frère Marie-Victorin's dream has come true, and the Montreal Botanical Garden proudly takes its place among the best of its kind.

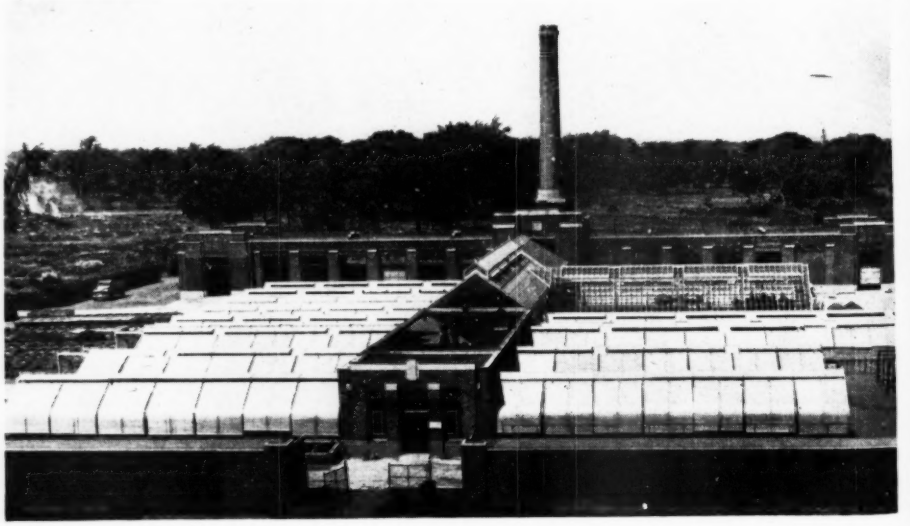
GLOXINIAS (from page 140)

hybridizers were not idle. Antonelli Brothers of Vera Cruz, California, also placed some dazzling, colored, frilled, and open-faced gloxinias on the market. Their newest, 'Kiss of Fire,' promises to be the ultimate in a compact, red gloxinia. Otto Panzer of Portland, Oregon, has given us 'Panzer's Beauty,' a ruffled, red gloxinia which is a florist's standby. Here in the Northwest we have a wine-colored, pink-margined gloxinia, 'George Luxton,' which is an elegant plant and an especially good choice for the window gardener. It was originated by Richard Miller of Bachman's, Incorporated, Minneapolis.

Gloxinias make first-rate window garden or greenhouse material. Their wants are a rich, porous soil, good drainage, night temperatures 65° to 68° F., day temperatures 70° to 75°. Equal parts of peatmoss, leafmold, garden loam, and sand make a standard growing mixture. There is a packaged mixture, designed especially for gloxinias and African violets, which is especially handy when one is handling but a few tubers.

In northern climates gloxinias should be grown in east, southeast or south windows during the winter; north or northeast in a well-lighted room in late spring or summer will do perfectly. Gloxinias can be watered from the top or bottom as long as the soil is wet all the way through. Watering should not be done again until the topsoil feels dry to the touch.

A gloxinia tuber should be planted so that one can barely discern the top of it, when he looks into the pot, or so that the tuber is covered with not more than one-half inch of soil. Shallow planting discourages rot. A five-inch pot does nicely for one- to two-inch tubers. Summer-grown gloxinias bloom in about three months; winter-grown ones may take somewhat longer.



Main service greenhouse complex surrounded by the nursery. The new conservatories will be located in front of the wall in the foreground.

A well-budded plant will give up to three months of bloom.

Bud blast is generally caused from overwatering, too little humidity, or thrips. If there are silvery scars on the undersides of leaves or rusty spots on the calyx, the grower can assume thrips have been at work. They can be eradicated with one of the bomb-type house plant sprays.

Gloxinias are propagated through leaf cuttings, tuber cuttings, or seeds.

After gloxinias have finished flowering, they can be left to die down or, if clipped back to the last two leaves and kept moistened, they will often show renewed side growth. If the plants are to go dormant, the tubers should be stored in the pot or removed and stored in sand or vermiculite. A cool storage place about 55° F. discourages too rapid tuber recovery. Tubers stay firmer, if sprinkled lightly with water once or twice a month.

Gloxinia fanciers from all over the world have banded together to form the American Gloxinia Society, whose headquarters are at Gray, Oklahoma. The Society issues a bimonthly bulletin, "The Gloxinian."

JAMES W. PARRIS **(from page 146)**

newspaper said in its obituary editorial, "One of the few remaining links that bind this generation of Barbadians to pre-Victorian days has been removed by the death of the Honourable J. W. Parris, C.M.G.

"Born in November 1815, Mr. Parris had long passed the age allotted to man on this earth and attained one to which few men reach; but although during the last few years he had become somewhat feeble, his clarity of intellect remained with him to the last. A son of the soil, few men among us have furnished so strikingly an example of what thrift, energy, perseverance, and a strong will can accomplish. Without any of those adventitious aides to fortune which have proved so helpful to others, he entered the planting business at an early age of life — in his teens, in fact, and quickly worked himself up to a leading position. At one time Mr. Parris was the largest resident landowner in the island, and a large group of estates in St. Thomas belonged to him. The decline in price of sugar adversely affected him as it did so many others, whose investments were in sugar estates; and the crisis of late years caused some of them to pass out of his hands.

"Mr. Parris' energies were not confined to the acquisition of property. He was a very public-minded man, and no one has left his mark on the parish more than he has. A careful and conscientious legislator with no personal end to serve, he retained to the last the confidences of the public.

"In 1882 he was elevated to the Council, and the same thoroughness which characterized his work in the Lower was manifested in the Upper Chamber. But he had become more conservative. His experience had made him cautious; and the length of days naturally brings to all men of sound intelligence a certain measure of conservatism. He had no faith in Central (sugar) Factories. He opposed the railway scheme. There were other experiments which he opposed; but his conservatism, as a matter of fact, was not of a reactionary nature and never took a form actively opposed to progress. On the contrary, there was no measure for the advancement of the masses which came before the legislature that did not have his most careful consideration, and, if he was satisfied it proceeded on right lines, his unswerving support. He was a type of legislator almost extinct in our midst. That is to say, he steadfastly refused to support measures until he thought them out for himself; and he did not believe because it was easy to pass amendments tomorrow there need be no hesitation in muddling today. He always evinced a thorough knowledge of the details of all bills that were introduced, thus furnishing an example for younger men to follow — and in Committee he was ever an invaluable assistant. As a result, although he was not a brilliant speaker, his remarks were always listened to with the greatest attention and carried weight both inside and outside the Legislature. His independence of character made it a matter of indifference to him whether for the time being he was on the popular side of a question or no; and his sterling honesty of purpose compelled those who may have differed from him on any public matter to respect his opinion the more because it was opposed to theirs.

"In 1897, Her Most Gracious Majesty, the late Queen Victoria, was pleased to appoint him a Commander of St. Michael and St. George, as a recognition of his long and faithful services to the colony; the honour had never been better deserved by any local man. In 1900, feeling that the time had arrived when he should free himself from the cares that public life imposes, Mr. Parris resigned his seat at the Council and retired into private life taking with him the respect and esteem of his colleagues at the Board, the Executive, and the public generally. Speaking to the announcement of his retirement, the Honourable W. K. Chandler said 'Mr. Parris left an indelible mark behind him, and when the history of the country is carried on from where it had been left by Schomberg, Mr. Parris will be an important character therein.' These are words of simple truth, Mr. Parris' work has not been of a pyrotechnical nature. The unobservant may pass it over. But the historians will bear witness to it in many matters, when the names of less solid workers will have passed away and be forgotten."

The Honourable W. P. Leacock, a member of the House of Assembly at the time of Mr. Parris' death, memorialized him in that legislative body as follows: ". . . He was a staunch and reliable man, and he commanded the respect and esteem of the whole community. He was a most independent member of the legislature and never allowed himself to be influenced contrary to his convictions in any matter requiring his vote. We can truly say that the Island has lost a valuable son, and one who served it well and faithfully, possibly even at some sacrifice to himself. But whatever sacrifice he may have made he did not grudge it, for he never referred to it."

It is significant that no mention is made in either of these statements of the discovery of sugarcane seedlings by James W. Parris and his overseer, Iran Aeus Harper. Even then in Barbados, in 1908, the development of new varieties of sugarcane by breeding was in its infancy; Barbados was to become the center of this work in the West Indies. Few people there today realize that J. W. Parris and Iran Aeus Harper made world history in May 1858.

Rauvolfia Serpentina

By Joseph Monachino

A potted plant of *Rauvolfia serpentina*, gift of Edwin A. Menninger, Stuart, Florida, who grew it from seed obtained from Raghava Reddy, Penagaluru, near Madras, southern India. The plant is about two years old; the stem is 22 cm. long, and the peduncle 5 cm. long. In this specimen, only one fully expanded flower was present at a time, the older ones withering or falling off. A little nature faking was perpetrated for the purpose of photography — some of the shed corollas were picked from the soil where they had fallen, kept fresh in water, and then placed in the inflorescence.

THE drug from the root of *Rauvolfia serpentina* (L.) Benth. ex Kurz has within the last few years gained great importance in America and Europe in the treatment of hypertension (high blood pressure) and insanity. There are several preparations in the pharmaceutical market, for example, "Rauwiloid" and "Serpiloid" (Riker). "Alseroxylon" (Riker) is a mixture of at least nine alkaloids. "Raudixin" (Squibb) contains the whole powdered root. "Serpasil" (Ciba) is the commercial name for reserpine, the pure crystaline alkaloid isolated in 1952.

A monograph on reserpine was published on April 30, 1954, Annals of The New York Academy of Sciences, Vol. 59, Art. 1, pp. 1-140, "Reserpine (Serpasil) and other alkaloids of *Rauwolfia serpentina:* chemistry, pharmacology, and clinical applications." An elaborate treatment of *R. serpentina,* its botany, uses, and literature was prepared by the present author in January 1954 and will appear in a late 1954 issue of "Economic Botany."

The usual spelling of the genus is *Rauwolfia,* but to conform with the International Code of Botanical Nomenclature, it should be spelled *Rauvolfia.* The genus was originally so spelled by Linnaeus in *Genera Plantarum* in 1737 (also in edition 5 in 1754) and in the first seven editions of *Species Plantarum.* The name was in honor of Leonhart Rauwolf, a physician, traveler, and botanist of Augsburg in the sixteenth century. The letter w in the name, lacking in classical Latin, was transliterated to v by Linnaeus. The first botanical binomial for the species was *Ophioxylon serpentinum* L., and many earlier references will be found under this name.

The sedative or tranquilizing effect of the drug on the insane appeals to the popular imagination, and the plant has been widely featured in recent newspaper and magazine stories, starting with reports in the "New York Times" in 1953 (March) and "Science News" letter of the same year. "The Saturday Evening Post" (June 5, 1954) carried an article under the title "The drug that fooled the doctors." There are sure to be other magazine stories on rauvolfia in 1954, and some probably will appear before these lines are printed.

R. serpentina was an ancient medicine in India — it is reported to have been mentioned in 1000 to 800 B. C., in one of the old books of Hindu medicine. It is said to have been called sarpagandha and chandra (or chandrika) in Sanskrit. Sarpagandha refers to its use as an antidote for snake-bite; chandra, meaning moon, alludes to the use of the plant in lunacy. The root has been sold in Indian bazaars as pagalka-dawa (or pagla-ka dacra) which means insanity herb. In modern practice, the drug has been held in high repute by doctors in India for over twenty years. One Indian manufacturing firm alone claimed to have sold over fifty million tablets of the dried root.

The rauvolfia preparation "Serpina," manufactured by the Himalaya Drug Company in Bombay, was reported effective by Bhatia and by Kapur in 1942. Sen and Bose in 1931 reported rauvolfia valuable and safe in the treatment of high blood-pressure "almost to a precision not found possible with any other drug, eastern or western." They also found it an effective medicine in cases of insanity with violent maniacal symptoms. In the same year, P. C. Ray (Patna Jr. Med. 6:193) published a paper entitled "The hpnotic action of *Rauwolfia serpentina* (Dhan Marua)."

There have been many botanical references to the plant since the seventeenth century. Bauhin, Rheede, Kaempfer, Rumphius, and other early botanists made note of it. Over fifty vernacular names for the plant have been encountered; four of the more common ones are Chandra (Bengali), Ch'hota-chand (Hindi), Acawerya (Ceylon), and Poele Pandak (Java).

R. serpentina is native to India, Andaman Islands, Burma, Siam, Java, and possibly Sumatra. H. W. Youngken in "A Pharmacognostical Study of Rauwolfia" (Jr. Am. Pharmaceutical Assoc., Sci. Ed., 63. 1954) states that *R. serpentina* is native to Cochin China and the Philippines. However, there appears to be no justification for including these regions in the distribution of the species. Its northern range is limited by the sub-Himalayan regions; it ascends to an altitude of over twelve hundred meters in the Khasia mountains, but needs a tropical or subtropical climate. The plant prefers a moist, well-drained soil. It usually grows in a scattered fashion.

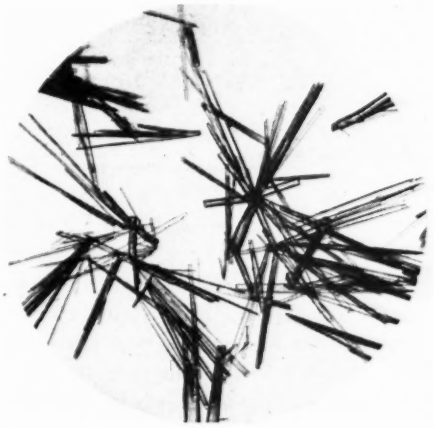
The commercial root is gathered from the wild and varies in its quality; some, like the Dehra Dun strain, have a higher concentration of active principle. It is occasionally adulterated with the roots of other species of *Rauvolfia;* and there are instances of complete substitution. These considerations, together with the fact that, as already stated, it is distributed in a scattered fashion, have suggested cultivation. The Forest Research Station of Indonesia has already set a rather large plot of propagation material (the plant can be best multiplied by root-cuttings) in mid-Java, where *R. serpentina* prospers well. The root is normally gathered from the third year of its growth. In its native habitat the

species flowers in different seasons, spring, summer, and autumn. It fruits readily, and specimens in cultivation in Florida (Menninger's Nursery) have also fruited.

R. serpentina is a small, erect, lactescent subshrub, rarely attaining one meter in height. In the potted plant received from Edwin A. Menninger of Stuart, Florida, the white latex was scanty and exuded only from the punctured upper part of the stem and the very young leaves. The root is bitter; it reaches a length up to 15-20 (—40) cm. and thickness of about 1-2.2 cm. The leaves are usually three-whorled, dark green above, pale beneath, mostly oblanceolate or obovate, 7-16 cm. long, 3-9 cm. broad; the lateral nerves are curved and widely spaced. The cymes form a congested hemispheric head at the end of a peduncle. The salver-form corolla is white, tinged with pink or pink-lavender, inodorous; the tube is 11-16 cm. long and the rounded lobes are 1.5-3.5 mm. long. The stamens are inserted well below the orifice of the corolla and externally indicate their position by a slight dilation in the corolla-tube. The matured drupes, 5-6.5 mm. long, are black and usually grown in twos united about half way. The seeds are single in each drupe.

When adequate material is at hand, *R. serpentina* is rather easily distinguished from other species of *Rauvolfia* associated with it, by its small size, capitate-congested inflorescence, and half-connate blunt drupes.

In the living specimen supplied by Mr. Menninger, the outside of the corolla tube was pinkish lavender shading to vinous mauve, and the limb was shaded much lighter. The upper part of the corolla-tube was whitish inside and the lobes on the inner surface were a clear white. The corolla-tube was pilose inside above the stamens, the white many-celled hairs spreading so that they screened the opening at the throat. The anthers were yellow. The filaments were thickened where attached to the anthers, and also inflexed so that the anthers appeared sessile; the filaments were decurrent on the corolla-tube. The ovary was green, style white, and the viscid clavuncle greenish. The sepals were carmine; as the inflorescence aged, the pedicels and peduncle (which at first had merely the tiny scattered bracts tinted red like the sepals) all became a strikingly vivid carmine. A lateral shoot next to the peduncle, hardly visible in the photograph, soon began to develop rapidly; there were two stem-primordia or buds at the base of the shoot. The new stem or shoot grew three centimeters in thirty days and had three whorls of leaves besides a basal pair of opposite leaves; terminating this stem was a small head of green flower buds. The flowers, that had opened one at a time as the older ones dropped or withered (the expanded flowers lasted but a day in our particular specimen), finally



Crystals of "Serpasil" (Ciba) greatly magnified. Serpasil is the trade name of reserpine derived from the root of *Rauvolfia serpentina*. Being a single pure hypotensive-sedative alkaloid, it yields predictable constant results and offers unvarying potency with accuracy in dosage.

were all gone, and the carmine peduncle with its inflorescence-head dropped off suddenly by a clean break at the base. In the meanwhile, the new shoot terminated by a green head of primitive flowers had developed rapidly. There now were about thirty well-advanced lavender flower buds measuring up to 11 mm. long, and other buds less developed. About two weeks had elapsed in the development of the tiny initial buds to a second, almost matured inflorescence. On June 10 the carmine peduncle and old inflorescence fell; June 14, the green floral tips on the laterial shoot were manifest; and on June 28, the second inflorescence was about ready to start again its progression of lavender blossoms.

CACTI AND SUCCULENTS **(from page 143)**

Mealy bug (an aphid which surrounds itself with a white cottony mass) and scale insects may be destroyed by touching the insects with rubbing alcohol — applied with a small water-color paint-brush or a pipe-cleaner. If the infestation is bad, it is best to use "Malathion," into the recommended solution of which a small amount of detergent such as "Fab" or "Tide" has been added. Do not use soap with "Malathion" or "Aramite." Be sure to follow the directions on the containers, and wash hands after using. "Malathion" should not be used on plants of the Stonecrop Family, such as *Sedum, Echeveria, Crassula, Cotyledon,* and *Aeonium;* for these it is necessary to use "Blackleaf 40," as per its directions, to which add some "Fab" or "Tide."

The only really tricky problems about cacti and succulents are watering and soil. The first thing to learn about them is that, while they came originally from arid and semi-arid regions, they nevertheless need water in their growing season, as do other plants. Also, desert soils are very rich in mineral content, because they have not been drained of their plant foods by rain which leaches the soil. This means that in the growing season, cacti and succulents must be watered and fed with some type of plant nutrients. It also means that they should be planted in fairly rich, but well-drained soil. The best general mixture, therefore, is good garden loam and coarse sand, mixed half and half. To this should be added a handful of agricultural lime and a handful of well-rotted leafmold to each peck of soil mixture. A second handful of the lime should be added, if the plants to be potted have white spines, white bodies, whitened leaves, or white incrustations. The mixture should be two-thirds sand, if the plants to be potted are stone mimicry or windowed plants.

Potting should be done with slightly moist soil. The pot should be the regular earthenware type with a drainage hole in the bottom. The hole should be covered with a flat fragment of pot. In planting, have the roots dry and spread them as well as possible, covering carefully with soil. Do not water for two weeks afterwards, no matter how dry they appear. Then give a light watering twice a week for two more weeks. After that water thoroughly twice a week during the growing sea-

(Continued on page 160)

Hemerocallis Kwanso fl. pl. from *100 Flowers* by Hishui, *circa* 1918

Japanese Wood Cut Flower Books

By **Nelson Coon**

Platycodon grandiflora var. from *100 Flowers* by Hishui, *circa* 1918

IT is just one hundred years ago that Admiral Perry, after a great deal of study and planning and with tact and diplomacy, succeeded in finding the key that unlocked the treasures in Japan for the western world. Until then, the land of cherry blossoms was known to us only through the reports of Dutch traders, and our horticulture had not access to so many of what are now our most prized garden flowers. The West soon discovered, after the opening of Japan, that not only were the Nipponese gardeners superb, but they had developed a printed literature on the beauties of flowers and their uses that favorably compared to American efforts.

Of course, it was true that in this, as in so many other departments of life, they received their inspiration from the culture of China; but with a typical Japanese thoroughness, they had added to gardening as well as to art and literature, elements peculiarly their own. The story of our debt to the gardeners and nurserymen of Japan, as well as the story of flower arrangement, is a long one and not within the province of these notes. Only one phase that is indicative of the love of flowers can be mentioned here — early woodcut flower books.

It is known to almost everyone that the claim of the West for priority in the printing process refers to the process of printing from movable type rather than to printing with ink on paper, for the Chinese developed such a process very early in their history, and passed along this knowledge to the neighboring Koreans and Japanese. Most of the early botanical works (as in the West) were in the nature of herbals, but they were scientific treatises, nevertheless. One such herbal,

Woodcut illustration of *Lilium auratum* from a Japanese school book of mid-nineteenth century

which may be seen at the Library of Congress, contains illustrations (and explanations of the medical uses) of the plant *Ephedra* from which comes our ephedrine, which was recently "discovered." This herbal of thirty volumes was printed in 1249, copied from an edition of some two hundred years earlier. It was this sort of book that the Japanese early reprinted in translation, using the woodblock printing process. Their materia-medica was based for perhaps a thousand years on these historic Chinese texts just in the same way as the medical writings of the West were based on the writings of Greek, Roman, and the later Arabic sources.

Intertwined with the very practical interest in plants for use in medicine, for famine relief, and gardening, was the use of stylized but accurate elements of flora and fauna in the arts. The early Japanese religious beliefs, especially those of Taoism, gave a special place to the beauties of nature. We see this reflected in the uses made of flower and plant forms in purely artistic creations, in painting, pottery, and sculpture — sacred or profane. All of these art forms made use of representations of flowers, while in other arts like that of Bonsai (tree dwarfing), formal gardening, and flower arrange-

ment, they endeavored to provoke representations of nature into telling philosophical truisms that they felt were inherent in all natural creations.

The woodblock method in use for many centuries in book printing was adapted in the seventeenth century for the production of "popular" art, much as we in America knew the Currier and Ives prints in the nineteenth century. The Japanese print makers are generally credited with having started the western movement we know as modern art, because the dynamic yet simple genre prints were studied and actually copied by such great students of Japanese art as Cezanne, Van Gogh, Gauguin, Toulouse - Latrec, Mary Cassatt, and others. Over the centuries during which such print making became common, it was only natural that the method should have been used by the plant-loving scientists of the time, to produce flower books. Books so produced were ideal in their delineation of flower characteristics and beautiful in their use of line and color. One great artist, Hokusai (like Leonardo DaVinci and Dürer) did many detailed botanical drawings of perceptive quality.

However, aside from the copies of Chinese works mentioned, we find few works of a special interest produced by the Japanese until the eighteenth century, with the exception of the works of those artists who used flowers, birds, and insects as elements in compositions. But in such use of flowers, we find not only simplification and adaptation to the medium, but always complete accuracy and what one writer has called "an exquisite courtesy to nature."

The extent of the development of horticulture in Japan is well shown in one of the books in the collection of the writer entitled *One Hundred Chrysanthemums*. This book was published by Sosen in 1736 and illustrates and describes one hundred of the many varieties of chrysanthemums. Each picture is accompanied by a description (size, color, and so forth) and also a little poetry eulogizing the variety. Such a well-illustrated monograph would equal any modern effort to discuss a particular species.

Another instance is the work of the artist Jakuchū, who engraved (first on stone) the illustration of Indian corn shown here. This picture was one of a series showing plants and insects also produced in the eighteenth century, and it is particularly interesting as being one of the few examples of a picture of an American plant known to have been drawn before Japan was opened to the West. One can only surmise that corn was introduced by the Dutch, who probably brought it from their western colonies to the port which they alone controlled for several hundred years — Nagasaki.

Two black and white illustrations from the eighteenth century book, *Plants and Insects*, by the famous artist, Jakucho

Celosia argentea var. *cristata*, woodblock illustration in full color by Kono Bairei in the nineteenth century

This same influence of the Dutch and their scientists is credited with having made possible the translation and illustration of books of botany which the Japanese published in the eighteenth century. The botanists Kaempfer, Von Siebold, and Thunberg were much interested in Japanese flora and contributed greatly to the enlightenment not only of the Japanese, but of the western world.

In spite of a lack of a strong western influence, the interest in botanical publishing progressed, and from 1818-1850, there were a number of editions of the works of one Tsunemasa Iwasaka. One such edition, of ninety-six volumes, was concerned almost entirely with medicinal plants. Another voluminous writer of this period was Yokusai Iinuma.

But just as the Japanese learned so quickly, after 1854, the western methods of mass production and other of our qualities (good and bad), so they also quickly assimilated the study of the, by then, world standardized botanical classification. Hardly thirty years after the opening of Japan, we find books, well illustrated with color woodcuts, appearing with all plants identified by Latin nomenclature.

An outstanding authority of the post-Perry period was Tomitaro Makino, his works being followed in the

(Continued on page 160)

WILD FLOWERS

in The New York Botanical Garden

Part VI

By **Joseph Monachino**

THE wild flowers selected for comments at this time (previous articles appeared in The Garden Journal, May to October 1953 and May to August 1954) can be located without difficulty. Three of these, however, have already fallen to partial extermination in the Park, two because of the filling in of a lake and one because of reconstruction of a road.

The botany of our area has been studied since the middle of the eighteenth century. Even after this long scrutiny, culminating in the eighth edition of Gray's Manual and the New Illustrated Flora, much remains to be done for the proper understanding of our local plants. The common weedy ladies'-sorrel, mentioned below, is an example of a plant which may reveal significant information by further observation right here in our Park.

Elymus riparius, nodding wild rye, is found along the Bronx River in the north meadows. The flower spike is nodding, well-exerted on its slender peduncle, and the awns are long and straight. This species was not recognized in the older manuals, for previously it was confused with (and contributed to the confusion of) *E. canadensis* and two other species. *E. riparius* (identified as *E. canadensis)* was collected by G. V. Nash in the Bronx Park in August 1896; it was also collected along the Bronx River by E. Bicknell in September 1898, and by A. Hollick in August 1907.

Fimbristylis autumnalis in 1953 grew along the northeast banks of the lower lake (the one of the twin lakes nearest the Bronx River in the north part of the Park). A portion of the lake is now being filled, and one can only speculate how this may affect *F. autumnalis* in 1954 or subsequently. The sedge is a low cespitose annual. The stem is flattened and ridged facially. The floral scales are spirally imbricated. They appear to dehisce near the base leaving, as they fall, a membraneous wing on the rachis; that is, the scales leave a tiny section of their basal margins on the axis of the spikelet. The styles are three-branched. The achene is minutely tuberculate near the base and short-stipitate.

Sagina procumbens, pearlwort, a moss-like perennial, grows in the cracks of pavements. It can be seen in bloom as early as March and as late as November. The opposite leaves are subulate and mucronate; the pair are connected at the base by a thin rim. The flowers in the plants observed were 4-merous; the petals very tiny, smaller than the sepals; the filaments with a green thickened base; the styles crystalline-papillose. The four valves of the capsule were opposite the sepals. The plants growing at the south side of the Museum Building were destroyed in August 1953, when the pavement was ripped up during reconstruction operations, but the species is still represented farther south on the automobile road.

Amaranthus lividus is the most plentiful amaranth in the Park. Although formerly rare, it is now often one of the abundant species in New York City. The leaf is emarginate at the apex; it is conduplicate in vernation. As in other amaranths, the petiole, the midrib, and lateral nerves on the underside of the blade, and also the stem are minutely white-marked with mostly rectangular specks that seems to be just beneath the epidermis. The inflorescences are axillary and also in terminal spicate panicles sometimes up to 10 or 12 cm. long. The terminal elongated tail-like spikes often far surpass the "short (1-2 cm.)" length described in the New Illustrated Flora. The utricle has a slightly wrinkled surface; it is indehiscent, not circumscissile as in *A. retroflexus* and *A. hybridus,* two species of pig-weeds also found in the Park. Much of the material previously called *A. viridis* belongs with *A. lividus.* According to an understanding based on the type in the Linnean Herbarium, the true *A. viridis* is the same as *A. gracilis,* with a very rugose utricle and differently shaped leaves.

Oxalis stricta is common in weedy habitats and lawns in the Garden and is also frequent in the whole of the New York City area. It can be had in bloom from (April-) May and June to October (-November), and in fruit, too, most of the time. The petiole is articulate at the base; and below the articulation, it has a flattened, narrow, oblong dilation called the stipule. Conduplicate and applanate in vernation, the obcordate leaflets are nodding before expansion. The flower buds are also nodding. In adjacent flowers of the same individual plant, the convolute petals may have the left or the right margins overlapping; there is not that directional constancy found in other genera. Rarely the aestivation is imbricate. The matured flower is erect. There may be tiny streaks of orange-red at the base of the petals, or the spots may be obscure or lacking. Regarding the position of the stamens in respect to the styles, Fernald writes homogamous; but observation reveals that there is an apparent trimorphism, that there are at least three clear relationships in the matured flower. There are plants with the upper anthers and the stigmas at the same level, others with the stigmas about 1 mm. above the upper anthers, and the third form with the stigmas about 1 mm. below the upper anthers, that is, between the upper and lower anthers. The prismatic capsule is erect on a deflexed or divergent pedicel pulvinate at the base. The matured fruit ejects its seeds violently when jarred. The seed is enclosed in a white translucent sub-fleshy coat which opens elastically along the abaxial margin, and both seed and seed-coat snap away explosively. The seed-coat turns itself inside out. The seeds are flattened-ovoid, transversally rugose, and are brown at maturity. The cotyledons are oblong-orbicular. In the typical form of *O. stricta* the pubescence on the lower part of the

stem is appressed; the capsule is hoary appressed-puberulent (long spreading hairs sometimes also present). But in the New Illustrated Flora, the species is conceived as embracing many different forms with variable pubescence, and *O. filipes* (capsule glabrous or nearly so) and *O. florida* (hairs on stem spreading) are relegated to footnote (synonymy?). These different forms or taxa (there are purple-leaved forms, too, and other variations) are at hand in the Garden and vicinity. Sometimes, however, extensive colonies consisting of thousands of individuals of a rather pure form occupying wide areas are observed, and one might suspect that a genetic factor is involved to result in such uniformity. Since the ladies'-sorrel bears abundant seeds and can be grown with facility, it is recommended as a subject for flower-pot culture and experiment planned to elucidate possibly botanical problems regarding the genus. The writer has been assured by a recent student of the group that *O. stricta* was used in a different sense by Linnaeus (and currently by the Europeans), and another name not in the Illustrated Flora or Gray's Manual must be applied to our plant. Two other undoubtedly distinct species of ladies'-sorrel or yellow sorrel are found in the Garden. *O. europea* forma *cymosa* comes into bloom a little later than *O. stricta*. A stand of *O. repens (O. corniculata)* on a lawn near the south corner of the Conservatory was observed flowering profusely but failing to set fruits.

Lindernia dubia grows on the muddy banks of the northern part of the Bronx River. There was a good stand of it until last year on the shore of the lower lake, but its security is doubtful like that of *Fimbristylis autumnalis* and for the same reason. The false pimpernel is low, depressed, and inconspicuous; it has a square stem, opposite, blunt, remotely dentate, punctate leaves and solitary, short-pedicellate flowers axillary to bracteal leaves. The pale lavender corolla is bilabiate; the lower lip has two papillose yellow ridges, which are free at the tips. The cells of the ovary are two, but the partition is so thin that it may be overlooked. Some of the flowers are apparently cleistogamous. In its details our plant agrees with var. *inundata*.

PETALS *to* PISTILS

FOR THE YOUNGER GENERATION OF GARDENERS

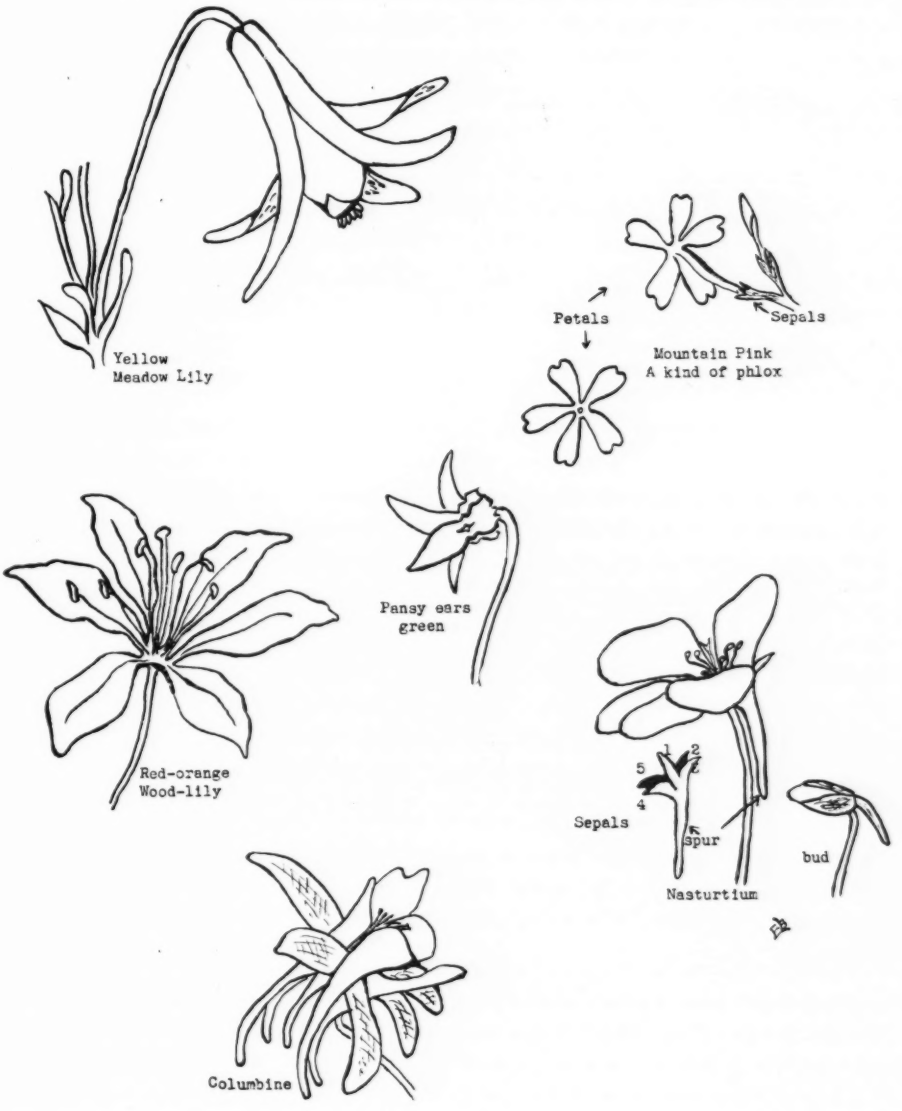
Part II — SEPALS

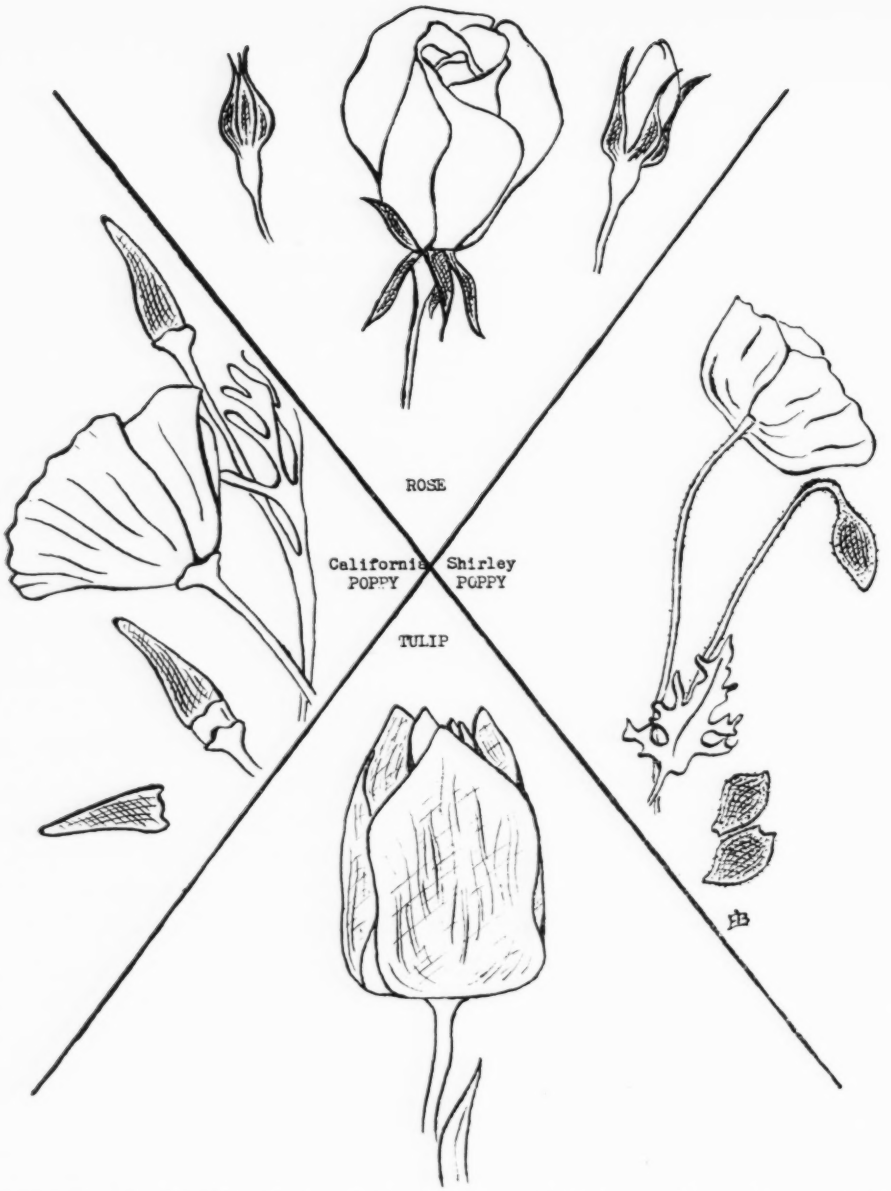
By **Elise Ludlam Bowles**

UNDER the petals of the rose all round the top of the flower stem are five little green things that look like leaves. They are as much a part of the flower as are the petals. Each little green thing is called a sepal. Petunias have them, so do morning-glories, pansies, violets, sweet peas, and many other flowers. The buds of these flowers are green, because at that time the sepals cover the petals. In that way they protect them from harm. As the buds get bigger, you can see bits of the petals between the green sepals.

Most poppies have only two sepals. As soon as the poppy flower opens wide, these fall off. If you look around on the ground or on the leaves of the plant, you can probably find them lying there. The California poppy is usually a golden-yellow in color. Like the other poppies it has two sepals. Instead of dropping off as the flower opens, these sepals stick together and are lifted up. At that time they look like little green caps. Then, as the petals open wide, these little caps fall off.

Other flowers keep their sepals long after the petals drop off. Roses are like that. They have five. So do apple blos-





soms. For a while after the petals drop off, you might almost think you had a little green flower there. Of course, it really is a flower that has lost its petals. An apple blossom, you know, grows into an apple. Look at the end of the apple away from the stem. There you will see five little sepals. They may be green or a bit dried up, depending on the condition of the apple. I just looked at an apple I bought in the super-market. Sure enough, there were the five little sepals. They are the same sepals that had been under the petals of the flower from which the apple grew.

Not all flowers have green sepals. A great many have sepals colored just like the petals. This makes it hard to tell which is which. Look at a tulip or at the picture of one. It seems to have six petals. Three of these, however, are sepals. Notice that three are on the outside of the flower and the other three are inside and nearer the center. We can say that the outside three are sepals and the inside three are petals. Lilies also seem to have six petals. With them it is not always so easy to decide which are which. Sometimes you just have to guess. A columbine flower has five petals each with a spur, and five sepals without spurs. They may all be colored alike, but because of the spurs it is easy to tell them apart. You remember, of course, that a spur is a narrow tube closed at the bottom. Bees and humming-birds like the nectar they find there.

I am sure you know that very brilliant scarlet red flower that blooms in late summer. It is called salvia. Both sepals and petals of salvia are red, but usually you see only the sepals. The petals drop off almost as soon as the flower opens. The two very brightly colored sepals are joined together just as petals sometimes are. Phlox also has its sepals joined together. There must be five of them, because there are five lobes or scallops. The flower we call mountain pink, which blooms early in the spring, is one of the phlox family. Its flowers and those of the tall summer phlox are very much alike. It is only the way the plants grow that is so different.

Petals are not the only things that sometimes have spurs. Sepals can have them, too. You probably know what nasturtiums are. The flowers are quite showy, yellow, orange, even red. I always think of a sunset when I see a lot of them together. The leaves are almost round and are attached to the stems in a way that makes one think the plant is holding up little shields. Some nasturtiums have five petals and five sepals. Others have more petals. Three of the sepals together make a long spur. You can easily find it by looking under the flower next to the stem. The other two sepals are joined to the flower, near where it is attached to the stem.

There are some wild flowers, too, with sepals shaped like spurs. These like to grow in wet places such as roadside ditches. They are sometimes called touch-me-nots. The flowers have such a queer shape you would be sure to notice them if any were around. They are yellow or orange and seem to hang by a thread. The orange ones are spotted. The spur is the biggest part of the flower. It is quite wide. It is, as I said before, a sepal. There are two other sepals, quite tiny.

Pansies have five sepals. They are just as green as green can be. Next time you see a pansy, turn it around. Instead of looking at its cute little face, look at its ears. I have some butterfly pansies in a little silver bowl on the table right here in front of me. The ears are as plain as can be. Can you imagine green ears?

Spurs, ears, what next! Hoods. There is a plant called monkshood, whose sepals look like blue petals. One sepal is quite large and shaped like a hood. Under the hood sit two little petals. This plant is not grown much in

gardens now, because parts of it are poisonous. For that reason it worries a gardener. Too bad, because it is beautiful.

When we were talking about petals, I told you that a clover was not just one flower but many. These are very tiny. Each has five petals and five sepals. The petals are separate, but the sepals are joined together.

There is another flower you know well that is also really not one flower but many. That is the dandelion. In the spring you can see hundreds of dandelions. Each yellow dandelion could have from one hundred to two hundred tiny, separate flowers packed closely together. There are as many flowers as there are petals. What's more, botanists who know all about flowers, say that each yellow petal is made up of several long thin petals. You can tell how many by counting the points across the tip of one. Better do it on a sunny day. Dandelions do not show their yellow faces when it rains. Because the points are so tiny, you may need a magnifying glass. But let's pretend that each yellow thing is just one petal. It will be easier to talk about it that way.

Around the bottom of each one are some tiny bristles. The dictionary says a bristle is a short, stiff hair. These are indeed very short, almost too short to be seen while the flower is still yellow. They are the sepals of the dandelion. Later the yellow petals will drop off and the flower will turn into a round white ball of fluff. Then on the round green top of the stem, you will see the dandelion seeds, each with a little parachute-like tuft of fine bristles to help the wind carry it away. These little bristles are the same sepals that were hiding under the yellow petals. Be careful not to scatter dandelion seeds on your lawn or anyone else's. The yellow flowers are pretty, but the plants they grow on can ruin a lawn. Just under our so-called dandelion flower is what looks like a ring of green sepals — but isn't. Botanists call it an involucre. They say it is made of scales. This is because the dandelion is not one flower but many, a whole head of them. There are many other flowers that are heads or collections of tiny, tiny flowers all growing closely together on top of a stem.

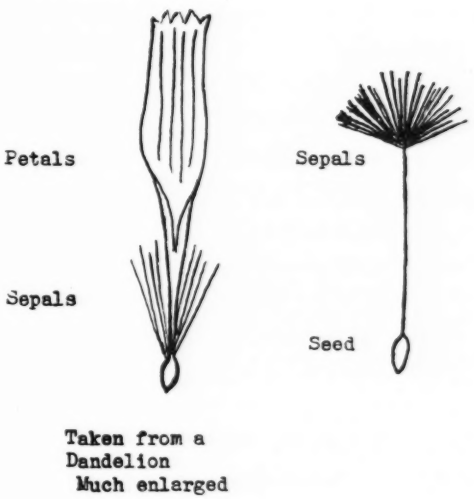
One is a very pretty wild flower that grows along the roadsides and in the fields. It is blue and is most often seen in the late summer and autumn. It is called chicory and looks a little like a blue dandelion growing on the side of a tall stem. It really is like a dandelion, but has only a dozen or two small flowers in each flower head. The dandelion, as I have already told you, has a hundred or two. Chicory also has a green involucre, made of scales that look like sepals.

Have you ever heard of a Dutchman's pipe? I mean a real pipe, belonging to a real Dutchman. I saw a picture in the newspaper of a man dressed in a Dutch costume and smoking just such a Dutch pipe. Well, there is a vine with big heart-shaped leaves and flowers that really look like a Dutchman's pipe. And that is the name of the vine. People sometimes plant it to shade their porches or terraces. The three sepals together make the pipe. The mouth of the pipe has three scallops or lobes, one for each sepal. There are no petals.

There are many flowers that have no petals, but have sepals that look like petals. Probably only people who have studied about such things call them by their right names. One of the most common is the white-flowered vine that grows over everything in the late summer. It is called clematis. Some flowers have neither petals nor sepals. They are usually flowers that grow on trees such as the willows, or sometimes on bushes such as the pussy willows. What do they have? Stamens and pistils. But I shall tell you about them in the November-December issue.

Chicory

Dutchman's Pipe



Taken from a Dandelion
Much enlarged

JAPANESE WOODBLOCK (from page 155)

decades of this century by the works of many others. One artist who seems to have contended himself largely with illustration was Kono Bairei, whose books of plants of various kinds all bear Latin names and very short descriptions in Japanese. His illustrations were extremely colorful as well as artistic, as can be but poorly shown in the accompanying black-and-white picture of celosia.

But it was one artist, Sigiura Hishui, who produced a collection of woodcut botanical illustrations which are, as Wilfrid Blunt says in his book on *Botanical Illustration*, truly "sumptuous" and which "must rank among the most decorative flower books of the present century." The character (though not the soft accurate coloring) of these illustrations is shown by the reproductions herewith presented. The plates are 9 x 15 inches in size, each accompanied by a separate sheet which shows (again in woodcut) a black-and-white silhouette of the growing plant, with still another page giving a full description and discussion of the subject, accurate botanical drawings of the distinctive flower parts, leaves, and so forth, as well as a photograph of the plant growing in its natural habitat. The set, produced in the years 1918-34, pictures one hundred plants only, but as a careful scientific work represents a peak, not only in scientific illustration, but in art as well.

From works such as these, a generally complete list of which is found in the bibliography prepared by Merrill and Walker (Arnold Arboretum 1938), we learn to appreciate the valuable contributions to botanical illustration which have come to us along with so many plants, from the "Land of the Rising Sun."

CACTI AND SUCCULENTS (from page 153)

son. Do not water on cloudy or rainy days. In winter or when the plants are dormant, water once every two weeks.

Fancy glazed bowls or painted pots without drainage holes should not be used if one desires healthy plants — lack of drainage and root aeration will eventually rot the roots and the plant will also rot at the soil line.

Since soil confined in pots becomes exhausted of its plant foods, plants should be repotted every third year in completely new soil.

Well-established plants will benefit by the use of artificial plant foods. For this purpose, "TraceL," "Miracle-gro," "Rapid-gro" or "Hyponex" are all satisfactory, but follow carefully the directions on the packages — overfeeding frequently will kill plants.

These, then, are the major precepts in the indoor culture of cactus and succulent plants. One is not expected to follow them to the letter, since conditions vary in different homes and apartments, and the same plant does not always respond to the same treatment if surroundings vary. There are times when the only way to handle a plant is by experiment to learn which is the called-for treatment. One may have to experiment with different soil mixtures, but remember the soil must always be well-drained. The plant's food is mostly obtained by the roots in liquid solution; therefore, some watering is absolutely necessary.

The one thing never to forget is that plants are living things, and must be given food, light, and air — prolonged lack of any one of these is fatal.

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BOOK REVIEWS

OUR WILDLIFE LEGACY. Durward L. Allen. 422 pages, illustrated, indexed. Funk & Wagnalls, New York. 1954. $5.

This is an excellent job of writing in plain English the basic knowledge now available in the still young science of wildlife management. It is clear and at times vivid, as would be expected by those who have noted Durward Allen's growing ability to present abstract or complex scientific material in simple language.

This book should give the layman, particularly the average sportsman, a much better understanding of the possibilities and limitations of wildlife populations.

The book is divided into three parts. The first part is an outline of the basic biological laws that govern the reproduction and limit the numbers of all living creatures. Appropriately entitled "Numbers at Work," it is broken into several chapters which outline the thesis that wildlife is a product of the soil, that most individuals in the populations of small wild creatures are short lived, that there are limitations on the total number of any species that can survive on a given area of land, and that good management is working with the full appreciation of these principles, and endeavoring to get the most production and use out of the annual populations produced.

Part Two, entitled "Paths and By-Paths," deals with the practice of wildlife management. It points out that there is a certain part of any wildlife population, which can be taken each year without interfering with next year's production. This philosophy is based on the fact that at the end of each breeding season, there are normally more individuals of any species than can possibly survive through the winter, and that those which are taken at this season of abundance simply reduce the total loss from other causes before the breeding season comes again.

There is a chapter on artificial propagation, chiefly devoted to pointing out the values of this management tool and its limitations, and a similar one on predator control.

Part Three, "The Method and the Outlook," contains four chapters which point out the necessity of better informed sportsmen; the need for greater use of the research data, and the prediction that as human populations and pressures grow, we can lose the wildlife which to many is one of the most precious of American heritages, unless we understand clearly and act quickly to preserve it.

All in all, it is a first-class job of writing by a good biologist and should be widely read.

IRA N. GABRIELSON, *Pres.,*
Wildlife Management Institute
Washington, D. C.

FUNDAMENTALS OF ECOLOGY. Eugene P. Odum. 384 pages, illustrated, indexed. W. B. Saunders Co., Philadelphia, Pa. 1953. $6.50.

Textbooks are written for a variety of reasons but may be best justified on one of two premises, either the current texts are out-dated factually or the author has evolved a new approach to the subject. In *Fundamentals of Ecology*, Dr. Odum has not only brought a fresh approach to a complex field but at the same time has produced a book which is up to date, teachable, and one which the non-ecologist can read with understanding and profit.

Dr. Odum has chosen to clarify the complex inter-relationships of organisms and environments by elucidating a series of basic principles and concepts. Each idea is stated briefly, then explained, and finally illustrated with examples. Dr. Odum's interest in birds and bird populations has led him to use many examples drawn from this field. Nonetheless, this reviewer was impressed with the range of the illustrative material which includes such diverse organisms as flour beetles, diatoms, mountain sheep, barn owls, trilliums, and man. The reader often feels that more equally intriguing information is available. Brevity, however, is both essential and advantageous to this presentation. The beginning student or the layman is not submerged in detail, and the advanced student is stimulated to illustrate some of the principles from his own experience. Some of the examples given will undoubtedly result in student-teacher discussion, always a beneficial activity. The examples are adequately referenced so that the reader can examine any subject in detail.

The first of the three major sections of the book is concerned with the basic principles and concepts of ecology. These have been carefully organized into two related groups of chapters, each prefaced by a brief introduction. The delimitation of ecology as a science is followed by a consideration of the concepts of ecosystem, habitat, the ecological niche, and biogeochemical cycles. The next chapter discusses limiting factors and is reinforced by an extensive listing of the physical components of the environment. Energy in ecological systems is considered in a stimulating chapter, which begins with a review of the laws of thermodynamics and ends with a discussion of productivity. This chapter features useful examples of energy relationships, including an alfalfa-calf-boy food chain contributed by Dr. H. T. Odum, brother of the author.

After an introduction to population and community concepts, a chapter is devoted to the relationships within populations of a single species. Considered here are all aspects of species development, birth rate, age distribution, density, etc. As a botanist, the reviewer regrets that especially here few of the illustrations are chosen from plant populations. The next chapter on organization at the interspecies level leads to the principles of species interaction. The final group of concepts are those involving the whole biotic community, including ideas of succession, climax, and ecotone.

Three chapters dealing with habitats and their related ecosystems comprise the second part of the book. Odum follows a discussion of the fresh water environment with one on marine habitats and finally considers terrestrial habitats, including major biomes.

The last section of the book, consisting of three short chapters on applied ecology, surveys natural resources, public health and welfare, and human society. These chapters provide stimulating reading; one could only wish that the wealth of material presented were not so carefully condensed.

Dr. Odum gives us frequent glimpses of the close relationship between physiological processes and ecological phenomena. For instance, in his discussion of population fluctuations he offers in explanation a theory (developed by J. J. Christian) based on physiological data having to do with population stress and hormone interaction. The correlation and fusion of such data from related disciplines, especially physiology and genetics, are essential to future progress in ecology.

Professional ecologists will not all agree upon the exact delimination or the organization of the principles Odum presents. This is not a reflection on the excellence of the work but rather a commentary upon the individuality of ecologists in general. Odum might, for instance, have dealt more specifically with the concept now firmly established by plant ecologists, namely, that no two communities are completely alike but instead are members of definite series or continua.

Odum's treatment of different subjects is not entirely uniform. There is only a brief discussion (twenty pages including maps) of the major biomes, while the consideration of the concepts of organization at the species population level is extensive (approximately seventy pages). However, the reader will find that ample material is available on biomes, while the concepts of species ecology and interaction are in need of this clarification.

For the teacher and conservationist, Odum's book is a source of much valuable information. More important, however, he has made a major contribution to organized thinking in ecology useful at the undergraduate level. This lucid approach will help to provide the sound basis necessary to explore the intricate problems implied in his closing sentence, ". . . diligent study of man and nature (as a unit, not separately) is in order before we can even begin to entertain the idea that we are masters of our destiny."

FOREST STEARNS
Dept. of Botany and Plant Pathology
Purdue University

A NATURAL HISTORY OF WESTERN TREES. Donald Culross Peattie. 751 pages, illustrated by Paul Landacre; indexed. Houghton Mifflin, Boston, Mass. 1953. $6.

Using the 100th Meridian as the eastern limit of the territory included, Peattie has portrayed the native trees of North America, north of Mexico, in a way that will bring them to life for many people. Where the subject is backed by personal experience, his treatment shows the natural capacity of the author for effective writing. Where the subject is outside the author's personal experience, the style at times becomes stiff and uninteresting and too often errors emanating from his source-authors are perpetuated in his work. Peattie has brought together not only botanical and ecological information about our western trees, but also the many ways in which they have entered into the history of the West—their ethnobotany, their intimate relationships with the lives of the early settlers, the qualities and uses of their wood, and something of their economic importance.

As for the arrangement of the text, the trees are grouped in families which are arranged in the systematic order followed in most floras, the Englerian System. Therefore, the gymnosperms are treated first, and, because of their great abundance in western North America, both as to kinds and species and as to number of individuals, more than one-third of the entire volume is thus devoted to the pines and their relatives. In the angiosperms or flowering plants, which fol-

(Continued on page 163)

NEWS, NOTES and COMMENTS

Educational Program Expanded. The Educational Program of The New York Botanical Garden has been expanded to provide afternoon as well as evening sessions. New subjects have been added and established courses revised.

The Two-Year Courses in Botany are designed for the amateur and include theoretical and practical work in the classroom and in the field. Students will study general botany, systematic botany, and cryptogamic botany. They will learn to identify plants, collect them in the field, and to press and mount specimens for an herbarium.

The fall 1954 term of the TWO-YEAR AFTERNOON COURSE IN BOTANY opens with classes in General Botany on Mondays, 2-3 p.m., September 27-December 13. Dr. H. W. Rickett, Bibliographer of the Garden, is the instructor. The TWO-YEAR EVENING COURSE IN BOTANY duplicates the Afternoon Course. Dr. Rickett will conduct classes Mondays, 8-9 p.m., September 27-December 13.

The fall and winter terms of the TWO-YEAR COURSES IN PRACTICAL GARDENING are devoted to classroom instruction, spring term to actual gardening operations. Cultivation of Trees and Shrubs will be studied in the fall 1954 term under Louis P. Politi, Head Gardener of The New York Botanical Garden, as instructor. Afternoon sessions will be held Thursdays, 2-3 p.m., September 23-December 16; evening sessions 8-9 p.m. the same dates.

Other subjects covered in this course are Plant Pests and Diseases, Indoor Gardening Practice, Fundamentals of Gardening, Outdoor Flower Gardening, and Outdoor Gardening Practice.

Students who complete the required work satisfactorily in the two-year courses are awarded certificates.

Expert guidance in designing, planting, and developing home properties is provided in the course on HOME LANDSCAPING. The first term, Winter 1955, on Planning the Home Grounds commences Thursday afternoon, January 25, 2-4 p.m., and extends through March 22. Arthur F. Murphy, who is Landscape Architect, in charge of Planting Design, of the New York City Park Department, will be the instructor.

Edgar A. Whitney, A.W.S., will conduct classes in LANDSCAPE PAINTING in water colors on Tuesday mornings 9:30-11, September 21-November 16. Mr. Whitney will give step-by-step explanation of each stroke and will help the student at work.

Demonstration, personal help, and class criticism will also be furnished by Mr. Whitney in the course of FLOWER PAINTING to be held 2:45-4:15 p.m., on the same dates, Septemebr 21-November 16.

INTRODUCTION TO BOTANY will comprise a series of lectures and field trips within the confines of The New York Botanical Garden. Emphasis will be placed on the identification of plants and their ornamental and economic values. Trees, shrubs, perennials, annuals, and wild flowers will come under the observation of students, with Howard W. Swift as instructor. Mr. Swift, recently appointed Assistant to the Curator of Education and Horticulturist of The New York Botanical Garden, was associated with the Garden from 1934-41 and has since been engaged in commercial horticulture. The fall 1954 term extends from September 11-October 23 and the sessions are held 1:30-3 p.m. Alertness credit may be arranged for New York City teachers.

NATURE STUDY FOR TEACHERS, arranged in cooperation with the Board of Education of the City of New York, is planned especially for teachers and is applicable toward alertness credit. It covers the study of plants suitable for a nature room in school and problems in growing them, and the planning of demonstrations and exhibits of interest and special significance to children.

Instructors in the fall 1954 term, Wednesdays, 4-6 p.m., September 22-January 12, will be Romaine F. Button, Director of School Gardens, Board of Education of the City of New York; Dr. Richard S. Cowan, Assistant Curator of The New York Botanical Garden; Miss Elizabeth C. Hall, Librarian of the Garden; Louis P. Politi, Head Gardener, and Howard W. Swift, Assistant to the Curator of Education and Horticulturist of the Garden.

A copy of the 1954-55 Educational Program, containing detailed description of the different courses and fees for same, may be had on request from T. H. Everett, Curator of Education and Horticulturist, The New York Botanical Garden, Bronx Park, New York 58, N. Y.

Theater Benefit. Mrs. James Cox Brady and Mrs. John G. Winchester, Co-chairmen of the Volunteer Associates of The New York Botanical Garden, secured the new production of the popular musical, "On Your Toes," by Rodgers and Hart, for the annual theater benefit on November 4. Mrs. Richard S. Meredith and Mrs. Charles G. Stradella are Co-chairmen of the Benefit Committee. Proceeds from the sale of tickets will be used for the Garden's program of horticulture, education, research, and exploration. For further information, contact the downtown office of The New York Botanical Garden, 22 East 60th Street, New York City.

One of the pillared walks across "Caramoor," the Italian villa of Mrs. Walter T. Rosen in Bedford, N. Y., which was visited on the Spring 1954 Garden Tour of The New York Botanical Garden.

Hudson Valley Garden Tour. The Volunteer Associates of The New York Botanical Garden have arranged a Hudson Valley Garden Tour on October 6 and 7 in cooperation with the Clermont, N. Y., Community.

Saturday Afternoon Programs. The fall 1954 series of free Saturday Afternoon Programs begins October 2 with an illustrated talk by Dr. Bassett Maguire, Curator of The New York Botanical Garden, on his trip "Up the Orinico in Search of the Blow-Gun Bamboo—The Rediscovery of Arundi-

The rare old wisterias, a gift from the Royal Family of Japan, are a feature of the terrace planting at "White Gates Farm," the home of Mr. and Mrs. Arthur M. Anderson in Bedford, N. Y. Mr. and Mrs. Anderson graciously entertained the participants in the Garden Tour at tea on their beautiful terrace.

The Station Internationale de Geobotanique Mediterranneene et Alpine at Montpellier, Portugal. This photograph, kindly furnished by Dr. Braun-Blanquet, arrived too late to accompany the article by Helen M. Fox on "A Visit to Portugal, Italy and France" in The Garden Journal, July-August 1954.

naria Schomburgkii." These programs are held Saturday afternoons, at three-thirty o'clock, in the Lecture Hall of the Museum and Administration Building, and are available to the public without charge.

Bayard Cutting Arboretum. The Long Island State Park Commission opened the Bayard Cutting Arboretum to the public on May 15, 1954. The tract of land, comprising almost six hundred and fifty acres, was deeded to the State by Mrs. Bayard James in memory of her father, W. Bayard Cutting. An endowment of $1,000,000 was established for the arboretum by Mr. Cutting's widow, who died in 1949.

The arboretum is on an inlet of Great South Bay and adjoins Heckscher State Park. The manor house has been converted to a restaurant, tea room and lounge; parking fields have been built, for which a fifty cent fee is charged.

Dr. William J. Robbins, Director of The New York Botanical Garden, is one of the five trustees of the Bayard Cutting Arboretum. The others are Gilmore D. Clarke, Chairman, Barkie Henry, Mrs. Henry Goddard Leach, and Standish Medina.

Dr. Firman E. Bear Retires From Rutgers. Dr. Firman E. Bear retired in June as Chairman of the Department of Soil Conservation of Rutgers University. He has won international fame for his work with trace elements in soil, and additional fame in recent years for his thought-provoking comments on whether man will reasonably soon outpopulate the earth's ability to grow food. Dr. Bear believes we can feed a billion people, if necessary. "Through replacement of the mineral fertilizers which have leached away from the soil, through irrigation and reclamation, through sound conservation of existing land, even through provision of new water supplies from the ocean to provide the enormous tonnages of water for irrigation, the challenge can be met."

Members of The New York Botanical Garden had the privilege of listening to a lecture by Dr. Bear on "Making Plants Grow Better" in the January 1953 series which was printed, in part, in the May-June 1953 issue of The Garden Journal.

Norman Jay Colman Award to M. Truman Fossum. M. Truman Fossum, Agricultural Economist in the U. S. Department of Agriculture, received the Norman Jay Colman award for 1954 from the American Association of Nurserymen, in recognition of his efforts directed toward the development of a sound program of economic research for florists and nurserymen. The award was presented to Mr. Fossum at the seventy-ninth meeting of the Association at Minneapolis on July 21.

Norman Jay Colman was often referred to as the "father of the experiment stations," because of his instrumentality in effecting the passage of the Hatch Act which provided for Federal aid to agricultural experiment stations. He was the first Secretary of of Agriculture—in 1889.

Mr. Fossum received the award—a gold and bronze medal portraying Mr. Colman in bas relief with the inscription "Horticultural Progress Through Research"—for his "Trade in Horticultural Specialties," a statistical compendium, published by the USDA in 1953. This publication presents historical and up-to-date information concerning the production and distribution of floricultural and ornamental horticultural crops.

Mr. Fossum is a Fellow of the Royal Horticultural Society. He holds a B.S. degree

M. Truman Fossum

in floriculture and ornamental horticulture from Cornell University and a M.S. degree from Ohio State University. He has certificates from the Royal Botanic Gardens, Kew, England; The New York Botanical Garden; and the North Dakota School of Forestry.

Flower Arrangement Symposium. The Garden Club of New Jersey will hold a flower arrangement symposium at the Women's Club of Upper Montclair on September 30, 10:30 a.m. - 4 p.m. Mrs. Harold L. Brooks will demonstrate "Distinctive Line and Design"; Mrs. J. Lloyd Berrall will show "Unusual Table Settings for Lunch and Supper"; Mrs. Laurence N. Wilson will prove that "Color is an Eloquent Ally"; and Mrs. Francis F. Merriam will make "Mass Arrangements for Special Occasions."

Tickets—patrons $10.00, associates $6.00, groups $4.00—may be purchased from Mrs. Harry G. Specht, 125 Lorraine Ave., Upper Montclair, N. J.

Seventh Annual International Orchid Show. The National Capital Orchid Society and American Security and Trust Company announces the Seventh Annual International Orchid Show to be held in the lobby—main office of the American Security and Trust Company, 15th St. and Pennsylvania Ave., N.W., Washington, D. C., October 23, 9:00 a.m. - 11 p.m., and October 24, 9:00 a.m. - 6 p.m. For information, contact the show chairman, Linnaeus T. Savage, Assistant Secretary of American Security and Trust Company, at address given above.

Dr. Herman A. Spoehr. Dr. Herman A. Spoehr, retired chairman of the Carnegie Institution's division of plant pathology at Stanford University, died on June 21 at the age of 69. He was a member of The New York Botanical Garden's scientific committee.

Dr. Spoehr was one of the first scientists to investigate the process of photosynthesis and was deeply interested in the possibility of large scale culture of algae for food production. He contributed an article on the subject, "A New Look at the Food Problem," to The Garden Journal, September-October 1952.

BOOK REVIEWS **(from page 161)**

low, the oaks are represented by the greatest number of species.

The volume is amply illustrated with beautifully executed wood blocks by Paul Landacre. With very few exceptions, these convey the feeling of the tree in question.

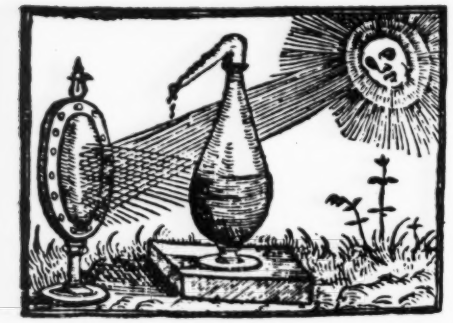
In choosing vernacular names, Peattie did not fall back upon those that have been coined in an attempt to designate for each plant a distinctive "common" name. Instead he has quite rightly attempted to choose the name most frequently used, feeling that "The correct common name of a tree . . . is the name used by the man to whom you are speaking." In addition, alternate common names of less frequent use are also listed. I regret that Peattie chose to list *Pinus Coulteri* under the name "Big Pine Cone" rather than under the much-used "Coulter Pine." The work of Thomas Coulter and his experiences in California certainly merit honoring him with the pine of his discovery in the common as well as in the scientific name.

A few unfortunate typographic errors have crept into the text. For instance, on page 600, in the discussion of the "elephant tree," we read that these trees occur in the "Tinajas Atlas Mountains" instead of in the "Tinajas Altas Mountains."

The volume is concluded with keys to the genera and species, a glossary of technical

(continued on page 164)

Bishop Rt. Philipose Mar Chrysostom of Kottoyan, South India, visited The New York Botanical Garden this summer and especially admired the water-lilies and lotus.



LET THERE BE HERBS

The herb garden is truly the most verdant spot of all in September and October. Early frost will nip the tender basils, perilla, and lemon verbena but the blue-green rue, golden-edged thyme, and bronze fennel seem to be enhanced by the cool, clear atmosphere. The brightest jewels of early autumn are the blossoms of *Crocus sativus*, the saffron crocus, source of the famous seasoning.

Be sure to include some of the small brown corms in your order for spring-flowering bulbs. Plant them as soon as received for the short-stemmed flowers bloom in October. If the bulbs are tucked under mats of creeping thyme, the blooms will be protected from spattering rains. In the spring the needle-like green leaves are inconspicuous, so planting saffron among the thyme will save it from being cultivated out.

Much showier, but equally deserving of a place among the herbs is the meadow saffron, or colchicum, with its over-size transparent blooms of great beauty. The roots are a powerful poison, used today in the treatment of gout. Colchicum should be planted under tall shrubs or among large perennials, where the heavy spring foliage will not over-shadow small plants. It blooms in September in many rosy purplish shades and, newly introduced, white.

True saffron does not increase very rapidly, so it is necessary to buy bulbs by twenty-five and fifty rather than by the dozen.

It is the slim orange stigmas, protruding like fiery tongues from between the deep-purple petals, which provide the seasoning herb. It takes a great many of the dried thread-like bits to make even a pinch of saffron. But a pinch is all you need, usually, to color rice or season a dish of chicken. Biochemists in India have discovered that saffron is a very fine source of Vitamin B.

A world-wide preference for saffron has been brought to this country by many nationalities. The settlers, known as Pennsylvania Dutch, favor it for noodles and cookies. You will like the latter served with a sweet sherry on a winter afternoon. Here is Mrs. Sydney Duerr's recipe for:

SAFFRON COOKIES

2½ c. flour
⅛ tsp. salt
¾ c. sugar
¼ tsp. saffron steeped in a small amount of warm water
½ tsp. baking powder
1 cup butter
1 egg

Cream butter and sugar, add egg. Beat until light and fluffy. Add saffron liquid (about 1 tbs.). Mix well. Sift in dry ingredients. Put into ice box until firm enough to roll into small balls. Flatten these with fork or a small glass with design on bottom. Bake seven to ten minutes in 400° oven.

GERTRUDE B. FOSTER

BOOK REVIEWS (from page 163)

terms, and separate indices to the scientific and common names. The keys are commendable in that, wherever possible, the principal characters employed are vegetative ones which are available for study during the major portion of the year, and in that technical terms are reduced to a minimum. A glossary following the keys defines those technical terms which perforce were used.

As for scientific names, Peattie mainly follows the latest International Rules for Botanical Nomenclature. His deviations from these rules are entirely understandable. Except in detailed monographic works, there is no need to adhere to the latest nomenclatorially correct name, when a familiar synonym lets us know to what plant we are referring. Synonyms, instead of being included in the body of the text, are given in the Index to Scientific Names where they are cross-referenced to the name under which the plant is found in the text.

HERBERT L. MASON
Dept. of Botany
University of California

THE MIND AND THE EYE. Agnes Arber. 146 pages, indexed. Cambridge University Press, New York. (Printed in Great Britain.) 1954. $3.

Dr. Arber's botanical writings have often had a rather mystical quality which is rather confusing to those who approach the study of plants on a purely analytical basis. In discussing the philosophical problems of a biologist, her deep appreciation of the necessity of finally fusing metaphysical and scientific thinking will give botanists a new insight into the bases of her morphologic hypotheses.

The first half of her compendium of natural philosophy is concerned with the initial five stages in a biological project, up through the publication of assembled data and hypotheses. The faults and pitfalls of biological research, as well as an awareness of the vast amount of work accomplished in the past, dominate this discussion.

The remainder of *The Mind and the Eye* is a study of the sixth stage in research, the impact and logic of hypothesis. Especially relevant to biologists is the discussion of the metaphysics of analysis and synthesis in biological thinking — a subject of much impact, especially to taxonomists and morphologists. Visual arts seem to bear the same avocational relation to biologists that music does to mathematicians; such impressions have a vocational importance to biologists also. (Anyone dealing with identification cannot agree with Mrs. Arber — and philosophers generally — that the visual nuances of *Anschauung* have no equivalent term in English; the "aspect" of a plant is well known to taxonomists.) Often the view of a plant as an entity is lost in an analytic welter of single organs, tissues, cells, and functions.

The Mind and the Eye requires a steady stream of concentration, and the abundant bibliographic footnotes prove to be no mean distraction in continued reading. This disadvantage may, however, be outweighed by the value of such a compilation of the literature of natural philosophy. A book such as this requires and is well worth rereadings.

J. J. WURDACK

WINTER-HARDY AZALEAS AND RHODODENDRONS. Clement Gray Bowers. 112 pages, illustrated, indexed. Massachusetts Horticultural Society, Boston. 1954. $3.

As a breeder of azaleas and rhododendrons resident in up-state New York and as author of *Rhododendrons and Azaleas*, one of the most authoritative works ever devoted to this subject, few persons could be better equipped to write on winterhardy azaleas and rhododendrons than Dr. Bowers. Such a background of experience is readily discernible through the easily read pages of this little book designed as an abbreviated ready reference for the northern fancier.

In the first half of these almost-too-brief 112 pages, Dr. Bowers presents helpful information about azaleas and rhododendrons, their nomenclature, peculiarities, soil requirements, and maintenance problems. The author may be more conservative than some of his readers in the use of newer controls for pests and for iron chlorosis, perhaps justifiably, and additional comments on the subject of fall frost injury and hardiness in relation to geographic origin might have been included. But these are minor points.

In the last 50 pages Dr. Bowers has undertaken the very difficult task of recommending kinds of rhododendrons and azaleas "that are presumably successful outdoors north of Philadelphia and where winter temperatures of 5 degrees below zero or lower may usually be expected." The fact that no two "experts" will be able to agree on assessments of rhododendron hardiness or desirability for at least the next twenty years — for the northeast or anywhere else — will detract in no way from the author's excellent recommendations or from the ability of this little book to fill most suitably a long-standing need.

HENRY T. SKINNER
U. S. National Arboretum
Washington, D. C.

NEW GREEN WORLD. Josephine Herbst. 272 pages, illustrations, bibliography. Hastings House, New York. 1954. $4.

In telling of John and William Bartram and their many contacts with fellow plant collectors of the eighteenth century, Miss Herbst has given us a glimpse into the ways of life and points of view of early Americans, as well as a picture of the vast wealth of natural resources and wild life here in this country.

The story of the two Bartrams, father and son, their passion for everything living or growing, is told convincingly and with charm.

There is much of colorful information in the letters constantly passing between John Bartram and his many like-minded friends — plants to be used for dyeing, cures learned from the Indians, and cultural hints for specimens collected and shipped to England. Their travels into the "wilderness" of this new country make delightful reading.

It is sad to realize how heavy has been the cost of "civilizing" this "wilderness"— forests destroyed, swamps drained, and birds such as the wild pigeon exterminated by hunters. These were once so plentiful that they flew "in living torrents" of two billion birds in their migratory flights.

There is much gentle humor in Bartram's correspondence with his friend in London, Peter Collinson, who begs for specimens of plants, insects, and especially turtles, the illustrations of which by William Bartram are remarkable in their style and accuracy.

In her opening chapters, Miss Herbst seems a little slow in getting into her subject matter, but the persevering reader will be well rewarded by the arresting and colorful picture of the times and by the realization

of the love of beauty and the "wonder" felt by these naturalists, seeing the New World with fresh and worshiping eyes.

BROOKS BARNES
Princeton, N. J.

THE GARDENER'S ABC OF PEST AND DISEASE. A. W. Dimock. 191 pages, illustrated, indexed. M. Barrows, New York. 1953. $2.95.

Here is a practical up-to-date book on pest and disease control by one of America's top-ranking plant pathologists.

I like it because Dr. Dimock has "leaned over backwards" to keep the control measures simple and practical and the descriptions of pests and diseases, non-technical.

Most backyard gardeners will find this little book far more helpful than more elaborate tomes on the same subject.

P. P. PIRONE

RINEHART'S GARDEN LIBRARY

Rinehart & Company have started a very attractive series of books addressed to the beginning gardener. The general editor, W. W. Goodpasture, has selected authors who are well versed in the special subjects assigned to them and has seen to it that the small books are attractively "packaged" — in other words, they have a very definite eye appeal to the amateur gardener.

The books are illustrated with pleasing pen and ink sketches by Rebecca and Douglas Merrilees.

The first six books of Rinehart's Garden Library made their bow this spring; they are: *Lawns* by John D. Bernard; *Evergreens* by L. L. Kumlien; *Annuals* by Ann Roe Robbins; *Roses* by Roy E. Shepherd; *Vegetables* by Jack M. Swartout, and *Small Fruits* by Ralph E. Barker. The price of these compact volumes is $1.50 each.

GARDENING. Montague Free. 440 pages, illustrated, indexed. Permabooks, Doubleday & Co., Garden City, N. Y. Permabook edition, 1954. 50c.

By special arrangement with Harcourt, Brace & Company a paper-bound edition of the very popular book on *Gardening* which Mr. Free first wrote in 1947 has been published. It has been carefully revised to add new and pertinent information and to delete all non-essential material. Certain chapters have been brought up to date — in particular the one on manures and fertilizers and the chapter on garden enemies has been almost entirely rewritten to include the latest methods of control.

PLANT DISEASES. F. T. Brooks. 457 pages, illustrated, indexed. Oxford University Press, New York. Second edition 1953. $7.50.

The first edition, published in 1928, was designed to give a general account of the diseases of British crop plants and to outline certain other diseases important in crop plants in other parts of the world. The second edition is a reworking, a rearrangement within the same plan and an amplification of material in the first edition. While new information has been added throughout the work, the greatest changes have been made in the chapters dealing with Virus Diseases and Diseases Caused by Bacteria. No attempt has been made to deal fully with the Non-Parasitic Diseases.

Organization within chapters emphasizes the taxonomic position and characters of the causal agents of disease, so that the book will be most easily used by a reader well trained in mycology and plant pathology. The several species within a genus of the fungi, for example, are discussed in sequence but with no particular arrangement of pathogenic species on the basis of the kind of disease involved or on economic importance. The discussion of each disease follows no stereotyped pattern but is written in an interesting and smooth flowing descriptive style that coordinates information on infection processes, symptoms, distribution and importance, climatic relations, and control measures. Numerous references are listed at the end of each chapter for the use of the expert, but one wishes that more might have been listed for some chapters and that certain other good summary papers might have been included in the lists.

The recommendations for control of various diseases and the final chapter on Fungicides will be disappointing to readers in North America. The recently developed organic fungicides and the modern techniques of applying them have not been tested sufficiently in Great Britain for recommendations to be made.

Unfortunately, there has been limited revision of illustrations in the new edition, and the poor half-tones as well as the good ones were carried over from the first edition. On the whole, however, the book is carefully prepared and extremely well edited. It contains a wealth of material of international interest.

HELEN HART
Dept. of Plant Pathology & Botany
University of Minnesota

THE DIAGNOSIS OF MINERAL DEFICIENCIES IN PLANTS BY VISUAL SYMPTOMS. T. Wallace. 107 pages, 312 color plates; indexed. Chemical Publishing Co., New York. 1953. (Printed in Great Britain.) $10.

This book was written primarily for the use of those concerned with nutrient problems of crop production. The most important feature is the collection of 312 plates in color of plants showing symptoms of nutrient deficiency of all except sulfur of the twelve chemical elements ordinarily classed as essential mineral nutrients. In some cases, symptoms of nutrient toxicity are shown. Vegetable and grain crop plants are well represented. Fewer fruit crop plants are shown.

This second edition combines the plates of the first edition (1943) and the supplement (1944) and regroups them by crop species instead of by nutrient elements. Most of the plants illustrated were apparently grown in sand culture, others were grown in soil. The author points out correctly that symptoms of a single nutrient deficiency readily produced in sand culture may be masked by the effects of other nutrient problems when plants are grown in soil. An example of this is the case of calcium deficiency which in the soil may be complicated by a high soil acidity complex.

The characteristics of the symptoms are in most cases quite distinguishable. The color values range from very good in some plates to less than fair in others. In addition to the plates the following features are included: descriptive summaries of the visual symptoms, brief discussions of some essential points of plant nutrition and of soils in relation to nutrient supply, and methods of determining nutrient deficiencies in crops with details of quick chemical tissue tests.

This book provides a worthwhile addition to the growing number of photographs in color of plants exhibiting symptoms of nutrient deficiency.

W. REI ROBBINS
Prof. of Plant Physiology
Rutgers University

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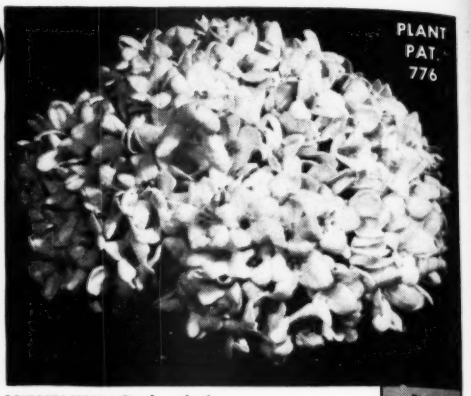

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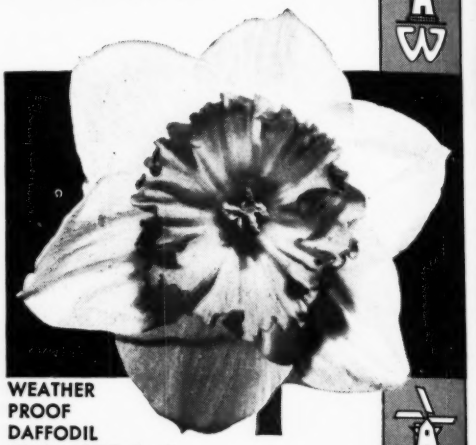

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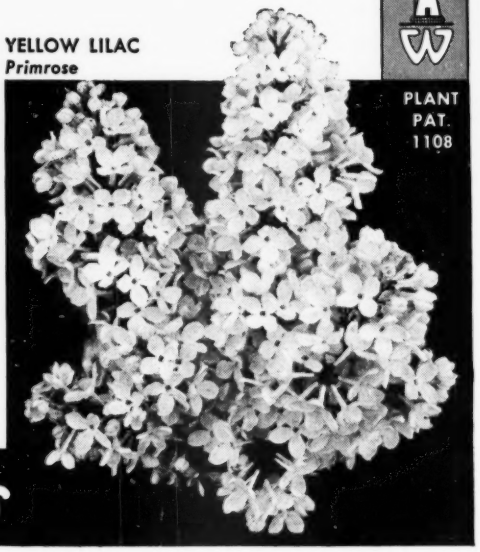

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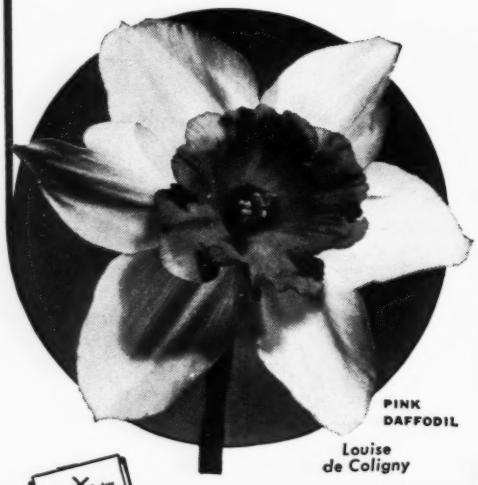

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